PB84-188853

Environmental Management Report for Environmental Protection Agency Region 10, March 1983

(U.S.) Environmental Protection Agency
Seattle, WA

Mar 83

U.S. Department of Commerce
National Technical Information Service
NTIS

PB84-188853

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

Foreword

This report demonstrates results-oriented management of Federal and State programs to address public health and environmental concerns in the Pacific Northwest. Our approach is to describe and rank the main environmental problems in Region 10 and to draw a clear line between those problems and programs under way to solve them.

For the past several years, this approach has been a fundamental, underlying—and successful—principal in the development of annual agreements between EPA and the States. These agreements describe management priorities for synergistic Federal, State and local work on health and environmental concerns. The agreements also provide measurements by which the effectiveness of government actions and programs can be gauged.

Evidence of the cooperative approach that is followed in developing these agreements is the letter from Pacific Northwest Governors that accompany this Foreword.

The report is in three parts. **Section I** describes problems and accomplishments for the general reader, and outlines State plans for actions to be taken during Fiscal 1984. **Section II** is intended to help State, national and regional program managers assess problems and action plans, allocate resources, and devise further actions to protect and enhance the environment of the Northwest. **Attachment A** includes graphics and tables that present the environmental status for all geographic areas in Region 10 for which data are available.

A major concern of EPA and the States in the Pacific Northwest is economic development. Close work between Region 10 and the States is needed to assure that industrial and population growth will be accommodated in a manner that preserves the unique environmental amenities of the Northwest.

It is also necessary to address the unique environmental public health problems of the area. The toxic contamination of surface and ground waters, for example, has lately emerged as a high priority problem that requires new strategies different from the conventional point-source-control strategies of the past.

This report is submitted to the public and environmental program managers to advance efforts to evaluate regional problems in the context of national environmental goals. We believe it will contribute to a greater awareness of the distinctive character of the challenge faced by the Environmental Protection Agency in Region 10.

L. Edwin Coate
Acting Regional Administrator

JOHN V. EVANS
GOVERNOR

OFFICE OF THE GOVERNOR
STATE CAPITOL
BOISE 83720

April 20, 1983

Dr. L. Edwin Coate
Acting Regional Administrator
U.S. Environmental Protection Agency
Region X
1200 Sixth Avenue
Seattle, Washington 98101

Dear Dr. Coate:

Thank you for providing an opportunity for my staff and the Division of Environment to review the EPA Region X draft Environmental Management Report. The report accurately highlights the most notable environmental problems and improvements in Idaho and describes quite clearly the actions being taken at the federal, State and local levels to deal with those matters.

I commend your effort to display environmental information in a reasonably nontechnical format such that the document might serve the dual purpose of program planning and public education. The agencies of the State of Idaho will continue to assist you in the development of useful environmental management information.

Sincerely,

John V Evans

JOHN V. EVANS
GOVERNOR

JVE:chh

cc: M. Lynn McKee, EPA - IOO

VICTOR ATIYEH
GOVERNOR

OFFICE OF THE GOVERNOR
STATE CAPITOL
SALEM, OREGON 97310

Dr. L. Edwin Coate
Acting Regional Administrator
U. S. Environmental Protection Agency
Region X
1200 Sixth Avenue
Seattle WA 98101

Thank you for the opportunity my staff had to review the 1983 Environmental Management Report prepared by Region X. I believe the report will be useful to the public, along with state and local officials, in understanding the close-mesh of the federal/state relationship in protecting our natural resources, yet avoiding regulatory duplication.

I was interested to note the emphasis on managing for environmental results. I am pleased to see actual scientific data used as project success indicators. I believe this system will more clearly communicate to our constituents, the residents of Oregon and of the Pacific Northwest, where environmental problems remain and the types of environmental improvement that can be expected--a much more valuable indicator than dollars expended in FY 83, FTE's or number of regulatory actions.

I look forward to our continued work together.

Sincerely,

Victor Atiyeh
Governor

VA:k
FK1873

State of Washington

JOHN SPELLMAN, Governor

OFFICE OF THE GOVERNOR

April 18, 1983

Dr. L. Edwin Coate
Acting Regional Administrator, Region X
U.S. Environmental Protection Agency
1200 Sixth Avenue
Seattle, WA 98101

Dear Dr. Coate:

Thank you for the opportunity to review the 1983 Environmental Management Report prepared by Region X. We appreciate your cooperation in responding to our comments on the draft report.

I am pleased to see a clear relationship drawn in the report between the environmental problems in our state and the Federal, state, and local programs. We need to protect and maintain a healthful, clean environment and to accommodate economic growth. I believe the report makes a persuasive case for continuation of the Federal/state partnership in environmental protection programs and for responsible allocation of Federal program assistance, both technical and financial, to Washington State and the rest of the Pacific Northwest.

I congratulate you on your success in explaining environmental problems and responsive programs in nontechnical terms and in providing measurements or indicators that elected officials, program managers, and the public can use to evaluate our joint efforts. Managing for environmental results is a worthwhile concept resulting in an excellent Environmental Management Report, and I trust your agency will continue to develop the concept as a management and information tool.

With best wishes,

Sincerely,

John Spellman
Governor

Legislative Building • Olympia, Washington 98504 • (206) 753-6780 • (Scan) 234-6780

Table of Contents

Section I: Overview and State Priorities

Introduction to Section I 1
Overview 1
State Priorities 5
  Washington 5
  Oregon 7
  Idaho 9
  Alaska 10

Section II: Priority Regional Problems

Introduction to Section II 13
Priority Regional Problems 13
Exposure to Hazardous Wastes 13
Water Supply:
Contamination of Ground Water and Drinking Water Systems 15
  Ground Water 15
  Drinking Water Systems 19
Toxic and Hazardous Materials in Marine and Estuarine Waters 20
Pesticides and Toxic Substances 23
Air Pollution: Carbon Monoxide and Ozone 25
Air Pollution: Particulate Matter 28
Microbiological Contamination of Estuarine and Shellfish Areas 30
Fishery Damage from Contaminated Waters 32

Attachment A

Tables

1. Ground Water Protection Problem Areas Identified in Region 10 16
2. Ground Water Protection Activities to Date and Strategies in Region 10 18
3. Contaminated Marine Estuarine Embayments in Region 10 21
4. Contaminated Marine Estuarine Waters: Past Actions and Control Strategies 22
5. Partial List of Region 10 Carbon Monoxide and Ozone Nonattainment Areas 25
6. Carbon Monoxide and Ozone Nonattainment Areas with Post-1982 Attainment Dates: Control Strategies 26
7. Ambient Air Quality Problems in TSP Nonattainment Areas 28
8. Particulate Emissions 28
9. Contaminated Estuarine Shellfish Areas in Region 10 30
10. Contaminated Estuarine Shellfish Areas: Existing Actions and Control Strategies 31
11. Contaminated Fishery Waters in Region 10 31
12. Contaminated Fishery Waters: Existing Actions and Control Strategies 37

Section I

Introduction to Section I

The first section of this report is a "report card" to residents of Region 10 on progress and plans for addressing their environmental and public health concerns. The overview is in two parts, the first a broad scale assessment of the state of the environment in the Pacific Northwest, and the second a description of State priority plans for actions in Fiscal 1984.

The second part of the overview is expected to be of greater interest to citizens of Northwest States than to managers and planners concerned with national environmental programs. The Environmental Protection Agency works closely with State governments to coordinate short- and long-term planning so Federal and State programs will directly support one another. This planning in Region 10 is based on an assessment of the importance of problems described in this report. It is generally understood that priorities may differ with the seriousness of each problem in any State. The results of cooperative planning, described in the second part of the overview, are incorporated in State/EPA agreements describing tasks to be accomplished in the following year.

Overview

Overview

Public concern about the environment of the Pacific Northwest has traditionally been very high.

A February 1982 survey by the Public Agenda Foundation indicated that 70-80 percent of the employed people in the Puget Sound area regard clean air, clean water, unspoiled natural beauty, and outdoor recreation (hiking and fishing) as very important to their quality of life. Other findings were that 78 to 89 percent say these values are well protected at this time and 66 percent say preservation of the environment should take precedence over new economic growth. *(Economic Development Council of Puget Sound, Interim Report: 1983.)* The survey group included people in the work force and working more than 20 hours a week. Retired people, homemakers, students, the unemployed, and those who worked only intermittently were excluded. Thus, although the sample was not representative of Puget Sound or the Northwest as a whole, the responses are suggestive of the public attitude.

Environmental programs existed in Northwest states ahead of many other parts of the country. This confirms the public concern indicated in the Puget Sound poll. However, extended recession has reduced the capacity of these States to maintain their programs. Budgets and staffing have been cut along with State revenues. As a result, environmental monitoring and program activities have fallen below former levels and there is increased reluctance to take on additional responsibilities to meet requirements under Federal laws. The most tangible evidence of the reduction in resources to date has been some States' inability to provide their share of Superfund cleanup costs, and the unwillingness of local governments to build water-supply improvements.

Air: *Gains May Be Temporary*

With respect to clean air, the public perception that the environment is well protected is generally confirmed by available data. Air quality is generally good and getting better—although changing energy-use patterns and other factors raise questions about that trend. Compliance with major clean-air regulations by industrial facilities in the region was 95 percent in 1982, compared with 91 percent in 1981.

Health-related air quality standards are met in all but 13 places in the region, most of them urban. There is no place monitored in Region 10 where sulfur dioxide or nitrogen dioxide now imperil health. Ambient concentrations of carbon monoxide and ozone are generally declining, as are particulate levels. Excessive levels of carbon monoxide primarily are due to motor vehicle emissions. Elevated concentrations of ozone (smog) are attributed to hydrocarbon emissions from motor vehicles and stationary sources. Ozone is created in the environment by the interaction of hydrocarbons and nitrogen oxides in sunlight. Significant cleanup of auto related pollution has been recorded in communities that have mandatory programs to ensure that emissions controls manufactured in the vehicles are working properly. Reduction in emissions from both stationary and vehicular sources has resulted in cleaner air.

Notable achievements in ambient carbon monoxide and ozone improvement include the following:

- A mandatory motor vehicle inspection and maintenance (I/M) program was begun in Portland, Oregon, in 1975. The net overall air quality benefit is estimated to be approximately 15 percent. Tailpipe emissions from vehicles repaired due to the program have been reduced 42 percent for hydrocarbons and 47 percent for carbon monoxide.
- A mandatory I/M program was initiated in the Puget Sound area on January 2, 1982. Public support has been strong. Initial testing shows that carbon monoxide from cars and trucks tested under the program has been reduced 28 percent, while hydrocarbons have been reduced 26 percent.
- Carbon monoxide concentrations in Salem and Eugene, and ozone concentrations in Salem and Medford have been reduced to near or below ambient standards. These areas may be eligible for redesignation to "attainment," subject to analysis of recent data.

Particulate air pollution problems in Region 10 have been more difficult to solve. EPA and the States are continuing efforts to reduce particulate emissions. Several communities have completed or are carrying out plans to reduce "fugitive" dust from roads and parking lots. Current EPA-State strategies aimed at limiting total suspended particulates are likely to be supplanted in 1983 by issuance of a new national ambient air quality standard to control very small, inhalable particles believed to be more closely related to human health problems.

Major programs to reduce particulate emissions were recently completed at industrial facilities in Lewiston, Idaho, and Vancouver, Washington. Emission reductions of approximately 50 percent and 85 to 90 percent respectively were obtained. Based on these reductions—and corresponding improvements in ambient particulate levels—Lewiston (plus neighboring Clarkston, Washington) and Vancouver may qualify, in calendar 1983, for redesignation to attainment or nonattainment for secondary standards only.

Even so, changes in power-generation and home-heating trends may raise new problems. Region 10 has little opportunity to develop more large new hydroelectric power generation, and recent nuclear power plant projects have encountered serious financial and political barriers. An increase in fossil-fuel, particularly coal, power generation may occur as conservation alternatives are exhausted. The Regional Office recently issued its first permit to prevent significant deterioration of air quality downwind of a major new coal-fired power plant. Activities also are under way to reactivate and develop coal mines and a coalport for the Pacific-rim export trade. These developments raise the potential for more air and water pollution.

Electricity remains the prime home-heating medium in Western Washington, and second most common in Western Oregon. There is growing concern, however, regarding the increasing use of wood as a replacement or supplemental fuel for home heating, due to rising electric-power rates.

Particulates from wood stoves are already a barrier to attainment of the health-related air quality standard for particulates in Medford, Oregon, and are one of Portland's most important air pollution problems. (The 1983 Oregon Legislature is considering a bill to allow only clean-burning wood stoves to be sold in the State.) Looking ahead, diminishing supplies and rising prices for wood fuel have led to predictions that coal will replace wood in residential heating. This development could result in serious degradation of air quality, especially in urban areas.

The problem of airborne toxic pollutants is gaining attention with the discovery of lead, cadmium and arsenic as air contaminants at two hazardous waste sites investigated for Superfund in Seattle and Tacoma. More such investigations are underway.

Environmental concerns about possible long-range transport of air pollutants are receiving increasing public attention in the Northwest. Preliminary data from a monitoring study in progress at the University of Washington indicates that acid deposition may be stronger than previously thought. A major concern is how the acid deposition may affect wilderness lakes, forest productivity, corrosion of structures, and speed the leaching of contaminants from soil. Satellite photos tend to support allegations that emissions from a smelter in northern Russia may cause atmospheric haze in the arctic regions of Alaska. More monitoring and research are needed.

State implementation plans to protect visibility—a prized asset among Pacific Northwesterners—will require greater emphasis on ways to control forest burning, agricultural field burning, and urban plumes. New regulations on burning may be needed.

Finally, additional air pollution may occur as a delayed result of recent recessions. During the downturns, industries postponed maintenance and deferred upgrading existing facilities and building new plants. Some facilities also got economic-hardship extensions to compliance schedules. When old, poorly maintained plants begin to push production to capacity, industrial emissions may substantially increase. This potential problem also should be investigated.

Water: *More Problems Than Solutions*

Northwest surface and drinking water quality issues are in some respects those of the Nation in microcosm. Region 10 includes areas of moderate to heavy rainfall, like those in regions east of the Mississippi River, and arid lands more typical of the West and Southwest.

Violations of water quality standards, impairments of intended uses and significant perils to human health are caused by both point and nonpoint sources. In Region 10 the majority of point-source controls required under the Clean Water Act are in place and compliance by point sources with discharge-permit limits on conventional pollutants is increasing. But serious water quality problems persist. The point-source controls have barely allowed EPA and the States to do more than stay even with pollution problems, especially in the face of past growth Attention to point sources is still needed in the light of projected population growth and the development of newly discovered abundant natural resources in the Pacific Northwest and Alaska.

Nonpoint sources are those, like irrigation return flow and stormwater runoff, that do not discharge wastewater from a discernible, confined, discrete source, as do industrial facilities and municipal sewage treatment plants. An estimated 60 percent of the Region's water quality problems originate with nonpoint sources. This fact is one reason why parts of so many of the major rivers in Region 10 have marginal water quality in relation to Federal goals, and the overall nine-year trend has shown little improvement in water quality despite significant reductions in point-source loading. In many cases further progress will not be possible unless nonpoint sources can be effectively controlled. In general, we anticipate that many nonpoint sources will be controlled through State water quality management planning and appropriate management practices. For example, each State in Region 10 has a Forest Practices Act and rules that have been analyzed for their impact on water quality. Also, the State of Idaho has developed a highly successful, State-funded, cost-sharing program in agriculture to provide up to $50,000 per farmer to implement best management practices to protect water quality.

Nonpoint sources are those, like irrigation return flow and stormwater runoff, that do not discharge wastewater from a discernible, confined, discrete source, as do industrial facilities and municipal sewage treatment plants. An estimated 60 percent of the Region's water quality problems originate with nonpoint sources. This fact is one reason why parts of many of the major rivers in Region 10 have marginal water quality in relation to Federal goals, and the overall nine-year trend has shown little improvement in water quality despite significant reductions in point-source loading. In many cases further progress will not be possible unless toxic contaminants and nonpoint sources can be effectively controlled.

EPA and the States have traditionally focused on control of point sources. The Clean Water Act provides comprehensive statutory and regulatory authority to control pollution from point sources to remedy existing water quality problems and prevent future degradation. By comparison, there is relatively little authority to cope with nonpoint-source pollution. This was appropriate in the past when untreated municipal and industrial waste discharges were common.

In Region 10 the majority of point-source controls required under the Clean Water Act are in place, but serious water quality problems persist. The point-source controls have barely allowed EPA and the States to do more than stay even with pollution problems, especially in the face of past growth. High priority attention to point sources is still needed in the light of projected population growth and the development of newly discovered abundant natural resources in the Pacific Northwest and Alaska. For example, projections show an increase of 16 percent in Alaska's population by 1985.

Ground Water and Drinking Water

One emerging problem in Region 10 is contamination of ground water by toxic and hazardous materials. Growing concern over this contamination is based partly on the fact that half of the public water supplies in Region 10 rely on ground water as their main source.

Several of the more highly populated areas in Region 10 rely on ground water for their public and private drinking water supplies, and these are the areas where much of the contamination has been discovered, so far. Work to prevent ground water contamination is urgent because, once wells have to be closed, there may be little to do except look for other sources or install costly treatment facilities.

In terms of our drinking water, 67 percent of the water systems in the Region, serving 89 pecent of the population served by public systems, provide water that fully meets bacteriological standards; however, the incidence of waterborne disease in the Northwest is among the highest in the country. Small water systems use untreated surface water sources that have been overtaken by growth, population pressures on the surrounding lands, and related environmental problems.

The basic strategy for improving drinking water quality has shown considerable success. Significant improvements have occurred in water-system compliance with drinking water regulations in Region 10. Compliance is up from 1980 data showing 46 percent compliance. In Fiscal 1980 insufficient monitoring data were available to determine the compliance status for 34 percent of the water systems. This percentage has now dropped to 19 percent having insufficient compliance data. Thus, there has also been a significant improvement in the systems' participation in the program.

Water systems have taken many actions to improve the quality of drinking water supplied to their customers. A few typical examples:

- In late 1983, the City of Everett, Washington, will have its new $40 million filtration plant in operation, where chlorination was the only treatment previously provided. The State worked with the city for many years to be able to finance and build this plant.

- Lincoln City, Oregon, uses a surface source for drinking water and had trouble meeting the Federal standard for coliform and turbidity. Several cases of illness among community residents apparently were caused by Giardia in the drinking water. Because of work by EPA and the publicity associated with the turbidity and the Giardia, Lincoln City obtained local funds to build a new treatment plant capable of consistently providing safe drinking water to its customers. The new plant is to be operational by December 1983.

- The City of Union, Oregon, frequently violated bacteriological and turbidity standards because of inadequate treatment of water from a surface source. As a result of EPA efforts, the City of Union has drilled a new well capable of supplying plenty of safe drinking water. All customers are to be connected to the new source by summer 1983.

Surface Waters

Toxic pollution of marine and estuarine waters at various places along the 35,819-mile shoreline of the Pacific Northwest has increasingly become a public concern because of recent studies documenting the Contamination of Puget Sound and its urban, industrial bays. Alarming rates of abnormalities among bottomfish and contamination of fish tissues have been discovered in the studies in the Sound. This has led concerned local health officials to issue warnings regarding the consumption of these fish and has raised questions about the continuation of the sport fishery.

Also of concern are what happens to the contaminants and what long-term effect they may have. So far, no one has the answers to such questions — and public officials face urgent decisions about closing areas for fishing, permitting new sources, and waivers from the secondary-treatment requirements of the Clean Water Act. State and Federal officials have initiated cooperative efforts to give them adequate information to make the appropriate decisions at the appropriate times.

One related question yet unanswered is how recent "red tide" occurrences, which imperil unwary consumers of shellfish, relate to water pollution. The danger in this situation is paralytic shellfish poisoning, which is potentially fatal to humans. This concern also will receive additional attention in the next several years.

Bacterial contamination of marine estuarine areas is a related problem threatening some of the most productive commercial and recreational shellfish rearing and harvesting areas in the country. Over the past few years these areas have been closed to harvesting on many occasions due to pollution from point and nonpoint sources. The consumption of contaminated shellfish is a serious potential threat to public health.

One example of accomplishment is in Tillamook Bay on the Pacific Ocean in Oregon. There, a memorandum of understanding that includes an alarm system has been developed with sewage treatment plants to minimize plant failures that might result in shutdown of the shellfish beds. Dairy farmers and the Tillamook Creamery Association also are implementing best management practices to prevent animal wastes from entering the bay. U.S. Department of Agriculture Rural Clean Water funds have been provided to help farmers implement the cleanup program. The Federal Food and Drug Administration has fully certified Oregon's program. Additional Rural Clean Water program funds will be devoted to this area and monitoring will be conducted to document the success of the program.

Additionally, a broad spectrum of aquatic and fisheries resources—both fresh and saltwater—are affected by toxic materials, solids and nutrients from point and nonpoint discharges associated with the major industries that support the Northwest economy, including agriculture, silviculture, mining, seafood processing, and oil and gas development.

Control of the point sources focuses on building municipal sewage treatment plants and developing and enforcing water cleanup permits. An example of progress resulting from the cleanup of a point source is the inner part of Bellingham Bay, known as the Whatcom Waterway. This waterway was one of the most highly polluted bodies of water in Washington State. While municipal and industrial dischargers contributed, the prime source of the problem was the Georgia-Pacific pulp, paper, and chemical complex on the eastern bank of the waterway. Georgia-Pacific installed a new secondary waste treatment plant in 1979. Dramatic improvements in the water quality of the inner bay have been achieved. Marine life is returning. We are still uncertain as to whether subtle biological effects persist. The State has reclassified the water quality standard to reflect improvements in dissolved oxygen, temperature, fecal coliform, turbidity, and aesthetic values as measured in the water column. Studies are beginning to determine potential toxics problems in the sediments of the bay.

Potential water quality problems associated with offshore oil and gas development and development of other large and valuable mineral deposits in Region 10 can be further minimized with active involvement of all appropriate regulatory agencies in providing technical assistance and in building an open working relationship.

Several success stories tell how Region 10 works early with mining companies to identify potential environmental problems and help companies design operating plans that are economically viable and minimize enviromental degradation. The Thompson Creek molybdenum mine in Idaho was described in The Wall Street Journal as a project able to minimize potential environmental degradation, get through the environmental permitting process successfully and meet its development schedule. The mine is under construction.

Hazardous Waste: *A "Ticking Time Bomb?"*

An estimated 2.7 million tons of hazardous wastes were disposed of in Region 10 between 1940 and 1975. Disposal practices during that period are now known to have been generally inadequate to prevent unintended after-effects that may imperil human or environmental health. Such practices are believed responsible for much of the ground water contamination now coming to light.

The expense of transporting hazardous wastes from nearly 2,000 generators, mostly in urban areas of the region, to distant disposal sites creates special problems in Region 10. The high costs of such transportation and the distances covered raise unique enforcement problems. In Alaska, for example, there is no hazardous waste disposal site and hazardous wastes must be transported for very long distances for proper disposal.

Poor or abandoned storage sites have been found to pose threats to human health, requiring public action to clean up and remove the wastes to approved sites. Such sites are the focus of the Federal "Superfund." Superfund is the common name for the program set up under the Comprehensive Environmental Response, Compensation and Liability Act.

Fifteen sites on the nationwide preliminary Superfund priority list are in Region 10. These are EPA-designated places where past practices were suspected of having left problems severe enough to warrant remedial cleanup by the Federal Government or the responsible parties. In some cases, enforcement actions are in progress. Of the 15 sites in the region, five are associated with hazardous organic compounds, four with toxic metals, two with pesticides, and one each with cyanide and radioactive waste. Investigations and remedial action, as appropriate, are underway at these and other sites.

The Federal hazardous waste program is still getting up to speed, and the Superfund process begins anew with the designation of each specific and unique site. In the meantime, Federal and State authorities are taking preventive measures to ensure the safety of present disposal practices, cleaning up emergency situations as they occur or are discovered, and developing long-term programs to prevent future problems.

Some notable achievements to date include the following:

- The State of Washington removed 350 barrels of hazardous materials stored dangerously on property next to a grade school in Tacoma.
- After extensive negotiations and enforcement actions failed to prompt a Tacoma recycler to cleanup a hazardous waste site, and after a major fire at the site, Region 10 did the necessary cleanup. About 350 barrels of stored material and contaminated soil were sent to a licensed disposal facility.
- Precedent-setting enforcement actions including orders under Sections 3008 and 3013 of the Resource Conservation and Recovery Act were taken at a hazardous waste management facility in Kent, Washington. This activity is still underway. Region 10 also has moved under the Superfund law to prevent deposition of new wastes at the facility and has taken steps to secure the site.
- Following the discovery at a site in Pocatello, Idaho, of more than 500 electric capacitors containing polychlorinated biphenyls (PCBs), transformer parts, and deteriorated drums, the Region 10 emergency response team secured the site, removed and incinerated the capacitors, removed and disposed of contaminated soil and stabilized the situation. Tests of the ground water in the area indicated no further problems at this time. Further testing will be conducted.
- Region 10 identified the source of gasoline from underground storage tanks in Nampa, Idaho, and helped the city clean up a downtown incendiary peril resulting from the gasoline-contaminated aquifer.
- The Trans-Alaska pipeline, an operation with the potential for extensive environmental damage, has had less leakage and fewer spills than predicted. No significant spills have been reported for more than a year.
- The Regional Office and the State of Oregon negotiated the voluntary cleanup of a hazardous waste recycling and storage facility where more than 1,500 drums and materials in bulk tanks had to be removed for proper disposal.
- A major chemical firm sent hundreds of barrels of chlorinated solvents to a reprocessor and moved thousands of cubic yards of contaminated soil to an approved landfill.

Toxic Substances: *Potpourri*

Region 10 also manages Federal programs to minimize the risk to environmental health from agricultural chemicals, asbestos, polychlorinated biphenyls (PCBs), and other toxic substances.

The diverse agriculture of Region 10 includes many small crops such as hops, mint, cranberries and wine grapes, for which pesticide developers do not find it economical to test and register chemicals. As a result, farmers customarily require special authorization for chemical uses on such crops. Efforts to avert or correct human health or environmental concerns resulting from such uses present unusual problems.

Investigation of reports of misuse of pesticide products and appropriate enforcement of use requirements is a State responsibility in Region 10. Problems with pesticide products include atmospheric damage to neighboring sensitive crops by herbicides, considerable contamination of wildlife by persistent chemical residues, rare instances of contamination of commodities, and exposure of humans.

Federal Food and Drug Administration inspectors and EPA inspectors routinely check food processing facilities to ensure that transformers containing PCBs in such establishments are not leaking. Federal law requires that all such transformers be removed by October 1, 1985. EPA also has developed a memorandum of understanding to prevent environmental contamination from PCBs at the largest hydroelectric dam in the Region. This understanding will result in the total phaseout of 32,000 gallons of PCBs at the dam by 1986; other dams also are beginning similar programs.

The Region 10 staff works with public and private schools in the Northwest and Alaska to assess and correct problems resulting from human exposure to friable asbestos.

State Priorities

The information in this Environmental Management Report is used by Region 10 and the four Pacific Northwest States to set priorities for actions to address environmental problems. Following are summaries of high priority problems covered in State/EPA Agreements being developed by Region 10 and the four States to cover problem solving actions in Fiscal 1984.

Washington State—*Problems and Programs*

People in Washington State enjoy a healthful, high quality environment in comparison with most other parts of the country. Accommodating growth while retaining this highly valued environment is a responsibility of local, State, and Federal government.

Existing laws provide a framework for agency actions to prevent problems associated with desirable growth. This summary focuses on actions to define and correct problems in the state. These problems affect the physical and economic health of many persons. A few examples:

- Unhealthful levels of air pollution were recorded in communities housing more than 2.2 million people in 1982. The air pollution situation, however has been improving for several years.
- Ten of the 15 hazardous waste sites nominated in Region 10 for Superfund cleanup are in the state of Washington.
- Although 97 percent of the population is served by bacteriologically safe drinking water, contamination of ground water used for human and industrial consumption has been recorded at a few points in aquifers serving more than a half-million people.
- In spite of improvements in recent years, the viability and value of the salmon fishery is still affected by environmental pollution, and important new problems have come to light.

Compliance with environmental laws and regulations is high in the State of Washington. Ninety-seven percent of the stationary sources of air pollution are in compliance and about 90 percent of the major municipal and industrial dischargers are in compliance with clean-water rules.

A top priority of EPA and the State of Washington is the continuation of basic State environmental programs in all program areas for which EPA and the State have responsibility, including pesticides (Department of Agriculture), drinking water (Department of Social and Health Services) and water quality, air quality and hazardous waste (Department of Ecology). Recent reductions in program funding together with an increasing workload require management to focus resources more directly on high priority needs. This focus on managing for environmental improvement will be assured through careful planning, budgeting and tracking.

Air Pollution

Three pollutants are of concern in Washington: carbon monoxide, ozone and particulates.

The health-related national air quality standards for carbon monoxide were to have been achieved in most places by the end of 1982; however, an extension through 1987 was allowed for Seattle, which adopted a mandatory inspection and maintenance program to reduce motor vehicle emissions. Further compliance efforts—and Federal sanctions if required—will be used to correct violations of the health-related carbon-monoxide standard in Tacoma, Spokane and Yakima.

Seattle, Tacoma and Vancouver have until 1987 to meet the ozone standard and are expected to do so. Controls manufactured into new cars have reduced emissions of hydrocarbons from motor vehicles. That has raised the relative significance of hydrocarbon emissions from stationary sources. As of 1980, such sources accounted for 56 percent of the emissions in the Seattle-Tacoma area and 52 percent in the Portland, Oregon-Vancouver, Washington, area, where Portland's motor vehicle inspection and maintenance program has reduced hydrocarbon emissions.

The health-related standard for total suspended particulates was to have been achieved throughout Washington by the end of 1982. Of the remaining areas listed as "nonattainment," Vancouver and Clarkston may have met the mark; future assessment of monitoring data will tell for sure. Problems with fugitive dust, such as road and parking-lot dust still bar achievement of the standard in Seattle, Tacoma and Spokane.

Issuance of a new particulate air quality standard for small inhalable particles likely would provide relief from the present requirement to control dust on roads and parking lots, and would make it possible to reassess the "nonattainment" status of Seattle, Tacoma and Spokane. These cities might then be moved into the "clean-air" category in regard to particulates.

Two sites nominated in Washington for emergency cleanup under the Federal "Superfund" law—Harbor Island in Seattle and the nearshore Tideflats in Tacoma—pose significant air pollution problems. These sites, which touch on several kinds of environmental problems, are discussed separately in this summary.

Water Supply

Ground water is the major source of drinking water in Washington. This use is being imperiled in several areas because of contamination. Such contamination has been identified near Tacoma and Spokane and is suspected in Kent, Yakima and near Vancouver.

Problems in the Spokane Aquifer (Spokane County) and the Chambers Creek/Clover Creek Aquifer (Pierce County) are a result of septictank drainfields, urban stormwater runoff and industrial waste handling and disposal practices. Four major municipal drinking water wells have been taken out of service in Pierce County because of industrial solvent contamination. Several private wells have been closed in Pierce and Spokane counties because of industrial waste contamination.

In Spokane and Pierce Counties, sewerage projects are underway as an alternative to septic tanks. In Pierce County construction is well along and in Spokane County the project is in the planning stage. State and local agencies are studying the Chambers Creek/Clover Creek Aquifer to find remedies. Local implementation of the Spokane County water quality management plan is continuing.

Actions to prevent further deterioration of ground water include hydrogeologic studies to improve understanding of ground water systems and pollution routes, water quality management planning to identify and eliminate pollution from nonpoint sources, aquifer protection under the Federal Safe Drinking Water Act, and the improvement of waste disposal facilities and practices. State officials are seeking authority to manage the Federal underground injection control program, which would strengthen regulation of these particular waste disposal practices.

The Federal "Superfund" program is one of the main resources available to treat or remove sources of contamination. Additional efforts will be made to treat or replace sources of drinking water. Nine of the 10 Washington state sites nominated for Superfund consideration were so ranked because of their effect on ground water. These sites are discussed separately in this report because many of them contribute to a variety of environmental problems.

Drinking Water. Ninety-seven percent of Washington's population is served by drinking water systems that consistently comply with EPA's bacteriological drinking water standards.

To continue this level of service and to raise the quality of water provided by all water supply systems, the State monitors drinking water quality and provides financial assistance for needed improvements, training of system managers and certification of operators, coordination among water suppliers and monitoring of drinking water quality.

Surface Waters
The State's goal is to retain and secure high quality in all its waters. Cooperative local, State and Federal efforts have stopped the deterioration of some bodies of water and restored others for recreational use, but much remains to be done.

Toxic pollution of marine and estuarine waters is a major concern, along with microbiological contamination of shellfish beds and pollution of streams where anadromous fish spawn, grow, or traverse.

Puget Sound is the recipient of innumerable rivers, streams, municipal, industrial and ground water discharges. Significant contamination has recently been documented in Commencement Bay, Elliot Bay, and Everett Harbor—all urban, industrial embayments.

The long-term, cumulative effects of the discharges to Puget Sound are of concern because of the importance of the Sound for recreation, fish, and shellfish. Actions already taken to control pollution of the Sound include the construction of municipal and industrial wastewater treatment facilities, the issuance and enforcement of permits to limit discharges from point sources, control of stormwater runoff and the development of improved management practices for nonpoint sources.

Recent studies by the National Oceanic and Atmospheric Administration have alarmed the public and raised questions about the adequacy of past actions to protect Puget Sound. State and Federal governments are cooperating in an effort to develop a long-term water quality management process for the Sound. Actions to be taken during Fiscal 1984 include:

- Set up a management structure involving the State Department of Ecology, EPA, and possibly an interagency advisory group to oversee, recommend, and coordinate environmental control activities in the Sound.
- Define the nature, severity, and causes of contamination in urban industrial bays. This work will be on a priority basis, starting with Commencement Bay, Everett Harbor and Elliot Bay. Where necessary and feasible, cleanup actions will be taken.
- Study of the cumulative, long-term effects of Puget Sound pollution.

Microbiological contamination of shellfish beds threatens part of the extremely productive Northwest shellfish industry and private recreational shellfishing. The problem is focused in the southern part of Puget Sound and Grays Harbor, and is generally due to inadequately treated or bypassed waste from sewage treatment plants, stormwater runoff and drainage from feedlots, pastures and septic tanks. The State already has a concept plan to pursue the protection of shellfish areas. This plan is one of three major elements of the Puget Sound water quality management program. The plan would set priorities to direct monitoring, planning and permitting activities affecting shellfish beds in conjunction with activities under the Coastal Zone Management Plan.

The Spokane River has experienced considerable improvement in water quality since the Spokane sewage treatment plant was upgraded to provide advanced treatment of wastewater in 1977. There have been no recent violations of State water quality standards; however, these gains may be in jeopardy due to larger or more frequent overflows of storm water and urban runoff.

The quality of water in Long Lake, downstream from Spokane, is unstable and summertime algal blooms cause concern. The amount of phosphorus in the system has nearly reached capacity. Controls of this nutrient will be closely monitored. Waste loading to the river may be curtailed during the critical June-October season. Ammonia, chlorine, and heavy-metals discharges also may be curtailed. A wasteload-allocation plan involving sources in Washington and Idaho will be started in Fiscal 1984, with completion expected the following year.

Concern about fisheries resources in Washington is based on toxicity, sedimentation, and nutrient loadings in streams where fish spawn, are reared, or traverse. In principal rivers of the State, 70 to 85 percent of the pollution problem is believed to come from nonpoint sources, now that most point sources are controlled. Dryland and irrigated agriculture and silviculture activities—all nonpoint sources—are the chief contributors of the pollution. The challenge to government is to encourage farm and forest operators to improve their management practices to protect and enhance the fishery.

Main problem areas in this regard include West Coast streams that pass through forest lands where improved industry practices are relied upon to bring continued improvement, and the Yakima River where agricultural practices and improvements in sewage treatment plants are counted on for correction. Also of concern are the lower Snake, the Palouse, Hangman Creek and many other small streams in Eastern Washington.

Hazardous Wastes
Hazardous wastes in Washington state come largely from electroplating operations, petroleum refineries and manufacturers of pesticides, other chemicals, and metals. Most of these sources are concentrated around Puget Sound; however, many areas of the state are potentially affected.

In implementing the hazardous waste program, the State's emphasis this year will be on issuing permits for treatment, storage and disposal facilities, evaluating compliance by major handlers of hazardous wastes, and providing technical assistance to transporters, storers and disposers, and to local governments concerned with the siting of hazardous waste disposal facilities.

More than 400 uncontrolled sites that may contain hazardous wastes—in addition to the 10 "Superfund" sites known to contain such wastes—have been identified in Washington. The State is to evaluate at least half of these 400 sites during Fiscal 1984, using special EPA funds. As appropriate, significant problems will be referred to EPA for determination as to eligibility for Superfund assistance.

The 10 Superfund sites proposed in Washington are:

- **Commencement Bay Nearshore Tideflats (Tacoma)**—This has been an industrial area for more than 50 years. Occupants include chemical companies, refineries, an aluminum plant, a pulp and paper plant, and a smelter. Nearshore Waterway sediments are contaminated with chemicals. Industrial waste was dumped as fill throughout the Tideflats. The Pierce County Health Department has issued warnings on fish consumption.

  The State and EPA have negotiated a cooperative agreement on investigation of known and suspected problems and corrective measures.

- **South Tacoma Channel**—The site has been a light industrial and business district for nearly 80 years and includes areas of ground water contamination, uncontrolled dumping and disposal, and a city landfill.

  Part of the Tacoma Aquifer is contaminated. Chlorinated organics have caused the closure of two city drinking water wells and a third is threatened. A swamp was investigated because of known disposal in the area. Investigations are underway to characterize the landfill and to further identify waste sources around Well 12A, the most contaminated well. Plans aim at correcting the problem at Well 12A so it can be on line in time to meet peak summer demands.

- **Lakewood/Ponder's Corner (Tacoma)**—In 1981, two major drinking water wells of the Lakewood Water District were closed due to contamination by synthetic organic compounds. More than 30,000 people are served by this water district.

  The water district is waiting for field-investigation results to determine the final disposition of the wells. EPA is conducting a hydrogeologic study of the contamination. This study, intended to identify sources and assess the problem, is to be completed in 1983. Future options include permanent closure or the installation of treatment units to cleanse the water and restore the wells to use. Ground water monitoring is expected to continue for the foreseeable future.

- **Western Processing (Kent)**—This industrial waste recycling and reclamation company has impacted local surface water with heavy metals and solvents. Work is underway under Federal law to identify ground water and soil contamination and to determine if pollutants are migrating off the site. In addition to actions under the Resource Conservation and Recovery Act, the Regional Office invoked the Superfund law to prevent deposition of additional wastes and to secure the site. If Superfund must be used for the cleanup, the State would have to pay 10 percent of the cost.

- **Harbor Island, (Seattle)**—High levels of lead have been measured in surface dust on Harbor Island, an island in the Duwamish River in an industrial area of Seattle. Heavy accumulation of lead in soils and dust have resulted in lead runoff into surface water, percolation of lead into unused ground water, and exposure via ambient air for some 6000 workers in the immediate industrial area.

  The City of Seattle and industries are paving areas known to contain lead-laden dust. It must be determined to what extent the lead problems on Harbor Island are caused by current emissions as opposed to the re-suspension of soil and dust.

- **Frontier Hard Chrome, Inc. (Vancouver)**—Process waste from this chrome-finishing plant contains high concentrations of chromium, which has been drained to the ground, contaminating the soil. This contamination threatens the major aquifer serving Vancouver. A full field investigation to develop a remedial action plan would involve 10 percent State funding.

- **FMC Corporation (Yakima)**—Agricultural pesticides and herbicides were dumped in an unlined pit on the company's property. The pit contains at least 36 cubic yards of mixed chemicals and residues, and the surrounding soil appears contaminated. A high potential exists for contamination of ground water, which is the source for private domestic wells in the area. The plan is to have the company clean up the site.

- **Pesticide Experimental Laboratory (Yakima)**—Wastes from the laboratory, sent into a septic tank drainfield, have permeated the soil and may have contaminated ground water. The site is about 3 miles from backup sources for the Yakima drinking water supply. Irrigation is now the primary use of downstream surface and ground water. The site operator is responsible to investigate and conduct necessary cleanup.

- **Colbert Landfill (Spokane County)**—This county-owned landfill is 10 miles north of Spokane. For five years, liquid solvent wastes were buried here in unlined pits in permeable soil.

  Some drinking water wells nearby are contaminated by liquids chemically identical to those that were dumped. Similar contaminants have been detected in ground water down-gradient from the dump site. The contaminants are considered toxic and persistent. In drinking water, some are suspected of being health risks.

  The rural area near the landfill is dependent on ground water for drinking and irrigation. No other supply is readily available. The State and local government are expected to pay up to half the estimated $50,000 cost of a study of cleanup alternatives.

- **Kaiser Aluminum (Mead)**—Old pot liner wastes piled on site have been identified as the source of cyanide contamination of ground water. The company has implemented a ground water monitoring program and source control. All known affected water supplies (27) have been connected to alternative water. The company will oversee the ground water investigation and prepare a remedial action plan.

Pesticides

A top environmental priority in Washington is investigation and enforcement against misuse of pesticides. Pesticide drift is one kind of misuse of particular concern in Washington. In Eastern Washington, vineyard owners complain of crop damage from 2,4-D drifting from neighboring wheat farms. The State is continuing to pursue solutions to these problems.

Oregon State—*Problems and Programs*

Oregon's air is generally clean, its water is generally of good quality and progress is being made in dealing with the most significant remaining problems. Although population growth slowed during the recent recession, efforts to protect and improve the quality of Oregon's environment continue to require high levels of public investment and sound management.

Among the significant problems still remaining:

- Unhealthful levels of air pollution in Portland and Medford. Air quality in both cities is improving. Unfavorable meteorology at Medford still permits excessive buildup of pollution from motor vehicles, and wood-stove smoke is a serious new problem.

- The quality of drinking water in many small Oregon communities still does not meet Federal standards, in spite of EPA efforts to date. The State is concerned about adverse effects on ground water resources from residential subsurface disposal of wastewater.

Oregon and the EPA are committed to a firm environmental enforcement program seeking informal resolution of routine violations within a limited timeframe—generally less than 60 days—as an alternative prior to initiating formal enforcement.

Air Pollution

Two Oregon cities, Salem and Eugene, are very close to attaining the health-related national standards for carbon monoxide and ozone. Analysis of recent monitoring data is expected to confirm that the standards were met in these cities last year. By 1985, the carbon monoxide standard is expected to be met in Portland, where a mandatory inspection and maintenance program has reduced motor-vehicle emissions. In Medford, where an inspection and maintenance program is to be initiated under the State clean-air plan, attainment of the carbon monoxide standard is expected by 1987.

The health-related air quality standard for ozone also is expected to be met in Portland by 1987, as a result of the motor-vehicle maintenance program and of controls on hydrocarbons emissions from stationary sources. Stationary sources accounted for more than half the hydrocarbon emissions in the Portland, Oregon-Vancouver, Washington, area in 1980.

Wood-stove emissions have a significant impact on Oregon's air quality. Studies have demonstrated that they are major contributors to atmospheric loadings of total suspended particulates and to the emission of very small inhalable particles that are believed to be associated with human-health effects. With the expected issuance by EPA in 1983 of a new national ambient air quality standard for fine particulates, wood stoves will be a major concern in planning control strategies to correct violations of the standard and provide room for future industrial expansion. The State's approach consists of four major elements:

- Certify stoves prior to marketing. This would require legislative approval.
- Explore the potential for retrofitting existing stoves to reduce emissions.
- Provide public information to describe the economic and environmental benefits of voluntary actions to reduce emissions.
- Continue to study the effect of wood-stove air pollution to improve the data base for air quality management decisions.

Water Supply

Drinking Water. The Environmental Protection Agency is responsible for carrying out the Federal Safe Drinking Water Act in Oregon, since to date the State has declined to assume this responsibility. While much has been accomplished by EPA's program over the past few years, there is clear evidence of a continuing serious public health problem caused by inadequately treated water and aging water supplies. Oregon ranks among the top few states in the country in the number of waterborne disease outbreaks. The rate of violations of drinking water standards remains well above the national average and rose 40 percent in 1982.

EPA believes that a strong, well funded State and local program, focusing on preventing and correcting local problems, is the most effective and efficient way to solve Oregon's serious drinking water problem. Until the State is prepared to assume full responsibility for safe drinking water, EPA will make every effort to address the existing situation. The major elements of EPA's drinking water program in Oregon are:

- Vigorously enforce reporting and water quality requirements with Federal prosecution of persistent violators.
- Increase efforts to identify actual or potential outbreaks of waterborne disease and ensure prompt response in disease events.
- Raise public understanding and awareness of the serious drinking water problem in specific communities and in Oregon at large.
- Continue to encourage the State to assume responsibility for safe drinking water in Oregon.

Ground Water. The State will continue in Fiscal 1984 to emphasize protection of ground water from contamination by surface activities or underground waste disposal. Because of its concern, the State in 1981 adopted a ground water protection policy.

Several aquifers, including areas near Florence, LaPine, River Road/Santa Clara near Eugene, and Clatsop Plains, already have been adversely affected by the increased density of residential subsurface disposal systems. The State is concluding studies of these areas and will develop and implement aquifer-protection programs in Fiscal 1984. The State also will work to develop sewage collection and treatment facilities in east Multnomah County to protect the aquifer as a drinking water source for suburban Portland.

Oregon also expects to begin establishing standards to protect ground water and to implement the Federal underground injection control program in Fiscal 1984.

Surface Waters

Stream quality in Oregon has improved during the past 10 years, though many streams, estuaries and lakes still do not meet the State water quality standards. The State has an effective water quality management program based on monitoring, prioritization of problems, and control of all sources of waste. To accommodate recent budget cuts, the State will concentrate on management of the existing base-level water quality programs, such as permits, construction grants and monitoring.

Economically important commercial shellfish operations on the Pacific Ocean coast of Oregon have been impaired by bacterial contamination in Tillamook, Coos and Yaquina bays. During the past few years, the State developed a comprehensive, cooperative local program to control Tillamook Bay pollution from agricultural, municipal and industrial sources. An evaluation of the Coos Bay problem is leading to development of a program to safeguard shellfish beds. An assessment of the results at Tillamook and Coos bays and, possibly, the start of a problem evaluation at Yaquina Bay are high priority projects for Fiscal 1984.

The Clean Water Act requires States to review and update their water quality standards every three years. Oregon's water quality standards were last reviewed and updated in 1979. The State expects to review standards and update basin plans during Fiscal 1984 on a priority basis, focusing on river basins where water quality is deteriorating. The South Umpqua River already has been identified as being in this category. Depending on available resources, the State will conduct a survey there in Fiscal 1984 as the basis for subsequent review of the water quality standards and the basin plan. Based on detailed water quality management planning and data collection and analysis, the State also plans to review water quality standards for the Malheur River and to revise the standards to reflect changes in the designated uses of the river system.

Stream water quality standards in Oregon are based in part on the need to protect the State's fishery. Toxicity, sedimentation, and nutrient loadings are of concern in streams where fish spawn, are reared, or traverse. It is estimated that 70 to 85 percent of the current pollution problem in Oregon streams is from nonpoint sources, now that most point sources are controlled. Dryland and irrigated agriculture, dairies, and silviculture activities—all nonpoint sources—are of concern.

Water quality management plans have been developed to address these problems; however, best management practices defined in cooperation with farmers and foresters either are not enforceable or are difficult to enforce, and significant water quality improvement may be impossible until the operators of nonpoint sources find it in their interest to implement such practices.

Hazardous Wastes

Effective implementation of the hazardous waste program rates high priority in Oregon. Under its Phase I delegation, the State devotes about 50 percent of its hazardous waste program resources to inspect and monitor facilities, review manifests, and ensure compliance with reporting requirements. High priority also is given to ensuring that hazardous waste facilities comply with ground water monitoring and financial assurance requirements. Also, the State will continue monthly inspections of the Arlington hazardous waste disposal site.

Over the past several years, EPA and the State have developed an inventory of 159 uncontrolled hazardous waste sites. Many of these have been closed after investigation and work is continuing on the others. Cooperative EPA-State efforts are expected to reduce the number of uncontrolled sites by half in Fiscal 1984.

Two sites in Oregon—Teledyne Wah Chang in Albany and Gould, Inc., in Portland—are on the proposed national priority list for "Superfund." In the case of the Gould site, the company is expected to undertake the cleanup. At Teledyne Wah Chang Albany, the EPA is expected to develop a Remedial Action Master Plan as a basis for initiating any required cleanup in Fiscal 1984.

Toxics Monitoring

There is an important emerging awareness of environmental contamination by toxic substances. Better data is needed in air, water quality, and hazardous waste programs in order to address toxics contamination. Additional monitoring capabilities are needed for dealing with abandoned dump sites and spills. Although Oregon has implemented EPA rules on hazardous air pollutants, there remains a need to identify, assess, and possibly control additional airborne toxics. Also of concern are toxic residues as well as substances in the atmosphere and substances that have leached into surface waters or ground water.

A rapid, effective means of identifying toxics problems is needed as a basis for protecting the public health.

Idaho State—*Problems and Programs*

Idaho has a longstanding reputation for areas with pristine air and water. Many of its residents were attracted to the state because of this perception. Less publicized however, are certain areas within the State that have very serious environmental problems. Solving these problems is the continuing thrust of State, Federal, and local cleanup efforts. Resource constraints are a major barrier to early and complete success.

Air Pollution

Two air pollutants are of concern in Idaho at this time: carbon monoxide and particulates. Environmental controls at the J. R. Simplot plant in Pocatello and the closing of the Bunker Hill lead smelter in Kellogg due to unfavorable economic conditions have brought sulfur dioxide concentrations in those areas within the public health standard.

The Federal Clean Air Act called for the attainment of the health-related standard for particulate pollution in all parts of the country, including Idaho, by the end of 1982. Violations of the health standard for total suspended particulates still occur in the Pocatello and Soda Springs/Conda areas. It appears that the Lewiston area has met the deadline; however, further assessment of monitoring data is needed to confirm this.

EPA is expected in 1983 to propose a new particulate standard focusing on small airborne particles that can be inhaled deep into the lungs, and which are believed to be associated with human health effects. The eventual promulgation of such a standard will lead to the reassessment of the "nonattainment" status of the Pocatello and Soda Springs/Conda areas.

Agricultural field burning in Northern Idaho has become a serious and controversial issue. Particulates from such burning are usually in the very small size range. The State will revise its program for smoke management and the control of such burning during Fiscal Year 1984.

The Clean Air Act also calls for the attainment in all areas of the health-related standard for carbon monoxide air pollution. The law allowed the Environmental Protection Agency to extend the deadline for communities that could not meet the 1982 date, but were taking effective measures to meet the standard by a final deadline in 1987. Sanctions against communities that failed by 1982 to take adequate steps to protect the public health against carbon monoxide air pollution are required under Federal law.

The health-related standard for carbon monoxide is exceeded during winter months in Ada County, which houses 18 percent of Idaho's population. In 1982 local government adopted ordinances to address this problem by requiring annual emission tests and maintenance to insure that controls built into vehicles are working properly. This program is currently not being implemented, and the possibility of Federal sanctions being applied in 1983 is real.

Water Supply

Drinking Water. Noncompliance with State and Federal drinking water regulations presents a significant potential threat to public health. Some water suppliers have never been inspected by the State, which has primary responsibility for implementing the Federal Safe Drinking Water Act. The State will take steps during Fiscal 1984 to assure facility and operational improvements for water systems that do not comply with bacteriological standards.

Ground Water. A large part of Idaho's population is dependent on ground water as a source of drinking water. The agricultural community and particularly the trout rearing industry in Idaho require large volumes of high quality ground water.

State and local agencies are implementing programs to protect aquifers against future problems, and a statewide ground water policy is to be developed in Fiscal 1984. Also the EPA will administer work in Idaho to control underground injection of wastes during Fiscal 1983 and 1984. On-site subsurface disposal, such as septic tanks, are a growing problem.

Surface Waters

Control of industrial and municipal point sources of pollutants has measurably improved surface water quality in Idaho. Problems still exist, however, including inadequate wastewater treatment and overloading of facilities from ground water and/or stormwater. A new potential problem is geothermal and small hydropower development, which are expected on a significant scale.

The most significant remaining deterrent to high quality surface waters in Idaho are the nonpoint-source problems. These types of problems typically include dryland and irrigated agriculture runoff, silviculture (forest harvesting) practices, and past and present mining activities. Water quality management plans have been developed and actions taken by local and State agencies to address these concerns; however, significant problems remain. Best management practices have been developed in many areas in cooperation with farmers and the State has a cost-sharing program to help farmers implement these practices on a limited basis. Difficulties also arise from the State's lack of resources to enforce agreements with the forest industry and the instability of the mining economy.

Seasonal fluctuations in river flow result in certain parts of Idaho's major rivers achieving only marginal quality. Levels of bacteria, nutrients, heavy metals, sediments and temperature are the water quality criteria most often exceeded. Attention is focused on those river segments that have the more severe pollution problems, with the exception of the South Fork Coeur d'Alene River. Due to past mining practices, and the contaminants leached from tailings piles the South Fork of the Coeur d'Alene has been severely damaged. Some control of point sources has measurably improved the situation but further improvements in nonpoint-source controls are not now regarded as cost-effective.

Idaho discharges to the Spokane River, along with those in Washington state, carry excessive amounts of phosphorus that adds to pollution problems in Long Lake in Washington. To correct this problem, a wasteload allocation plan affecting sources in Idaho and Washington will be started this year, with completion expected next year.

Hazardous Wastes

Idaho has a relatively small regulated community under the hazardous waste program. Idaho has one of the two major hazardous waste disposal complexes in Region 10. A significant problem due to improper disposal of electrical equipment containing polychlorinated biphenyls (PCBs) was recently discovered in Pocatello, and EPA is proceeding with cleanup and other actions. There have been a few other instances of improper management of hazardous wastes, one in which wastes disposed of in a municipal landfill imperiled an employee. There may be other situations that could lead to contamination of ground water due to leaching of chemicals.

Idaho has adopted legislation to enable the State to assume primary responsibility for Federal Resource Conservation and Recovery Act programs. The State is to develop regulations and submit an application for final authorization by July 1984. Local health departments are expected to continue taking part in a hazardous waste surveillance program. Also the State will continue to develop oil- and hazardous-spill response capabilities.

The inventory of uncontrolled hazardous waste sites in Idaho numbers 109. Several of these have been closed after investigation and work is continuing on the others. Those that cannot readily be cleaned up or closed will be considered for formal listing under Superfund.

Idaho has three sites on the proposed national Superfund priority list. One site may be eliminated from further consideration because the indicated environmental hazard does not appear as significant as it first seemed.

Alaska State—*Problems and Programs*

Alaska's environment, like so much about the largest state, has to be described in superlatives. It boasts the largest expanse of clean air and pristine water in the United States. Its 586,412 square miles include the world's largest molybdenum deposit, oil, coal and gold, immense forests and a highly productive fishery resource. As a consequence of its size, its climate, and its wealth of resources, Alaska also has some of the Nation's most difficult environmental problems.

- Frigid temperatures worsen urban air pollution in wintertime. High concentrations of carbon monoxide from motor vehicles threaten public health in both Anchorage and Fairbanks, and commuter traffic adds to an "ice fog" problem in Fairbanks.

- Rivers too remote to be regularly monitored at reasonable cost may be seriously polluted by natural-resource development activities that are equally difficult to monitor and inspect.

- Oil and gas exploration and development in Arctic and subarctic waters may affect bowhead and gray whales and other endangered species. Wastes discharged from fish-processing plants may affect the propagation and rearing of herring and other fish and shellfish for human consumption. And in the Southeast, timber harvesting practices and mine development may impact a rich salmon fishery.

Air Pollution

Most communities in Alaska are generally free of significant air pollution. Carbon monoxide pollution from motor vehicles continues to be a serious problem in Anchorage and Fairbanks, and the increasing use of wood stoves for residential heating has recently begun to cause problems such as those documented in the Mendenhall Valley near Juneau. High particulate levels from wood-stove emissions were experienced during the winter of 1982-83. The State plans to work with local officials to develop a long-term plan to improve air quality and allow for future development of the capital city.

Final revisions to transportation-control plans to meet carbon monoxide standards in Anchorage and Fairbanks are expected to require mandatory inspection and any needed tuning of motor vehicles. These actions would ensure the effectiveness of emissions controls that were manufactured into the vehicles. Implementation of these plans is anticipated during Fiscal 1984, with attainment of the health-related standard by 1987.

Water Supply

Although only 81 community water supply systems provide water that is known to fully comply with the national bacteriological standard and monitoring requirements for drinking water, these systems serve 53 percent of the population of Alaska. Most systems do not conduct monitoring activities required under the Federal Safe Drinking Water Act or State law. Consequently, little is known about the safety of drinking water served to many people in Alaska.

The State will increase fieldwork and compliance/enforcement actions in Fiscal 1984 to improve the frequency of monitoring at water systems serving more than 200 people, either residents or patrons.

Surface Waters

Alaskan surface waters face pollution problems from both natural and manmade sources. Some streams exceed normal turbidity guidelines due to natural conditions such as glacial ice breakup and snowmelt, which continues from spring to early fall.

In some cases, however, excessive turbidity, suspended-solids pollution, and contamination with heavy metals are the result of human activities, such as mining, construction, and timber harvesting. It is estimated that half of the pollution of Alaskan waters related to human activities originates from point-source discharges, such as mines, municipalities, or other industrial developments. The rest is from nonpoint sources, such as silviculture.

The EPA administers the National Pollutant Discharge Elimination System point-source control program in Alaska by issuing and enforcing limits on the discharge of pollutants. EPA and the State are cooperating in implementing long-range strategies to reduce pollution from several hundred mechanized gold placer-mining operations. Specific topics to be addressed include an economic analysis of the industry and available treatment technology, and gathering more data to develop a general permit calling for the best available treatment of water discharged to streams. Other issues to be addressed include applications for stream-use reclassification and a unified enforcement policy.

EPA also is working with the State to assure compliance by the seafood processing industry with Federal guidelines and State water quality standards. A general wastewater permit is being developed for many of the fish processors in 1983. Seafood waste discharges at Duch Harbor also are to be addressed by individual permits to be issued in the near future.

Increased offshore oil and gas exploration and development activities in the Beaufort Sea, Norton Sound and other lease areas will require EPA and the State to visit worksites to ensure compliance with general permits being developed by Region 10. Other developmental activity, such as gravel extraction, island and causeway construction, and the building of access roads also must be monitored to ensure the protection of natural habitat and ecosystems on the North Slope.

Major permitting decisions also will be made in Fiscal 1984 bearing on increases mining activities in Alaska. Of immediate concern are the US Borax molybdenum mine in the Misty Fjords National Monument area, the Noranda Greens Creek mine on Admiralty Island near Juneau and the Cominco zinc and lead mine east of Kotzebue. Issues such as marine disposal of tailings and performance standards for new sources of water pollution will be addressed in environmental impact statements and National Pollutant Discharge Elimination System permits.

Decisions on applications from coastal communities for waivers from the secondary-treatment requirements of the Clean Water Act also are expected to require a major focus of Federal and State attention during Fiscal 1984.

Hazardous Wastes

EPA administers Federal Resource Conservation and Recovery Act programs to control hazardous waste problems in Alaska. Although Alaska has few generators of hazardous waste, military stockpiles of equipment contain polychlorinated biphenyls (PCBs) and other hazardous and toxic substances. These stockpiles are several thousand miles from the nearest approved disposal sites located in the contiguous 48 states.

EPA and the State will continue to inspect important facilities containing hazardous wastes and monitor the movement of such wastes within and out of the state. Special attention will be focused on the military installations.

The State has drafted regulations as part of a hazardous waste program scheduled for adoption in summer 1983. Alaska will apply for EPA authorization to run a State hazardous waste program instead of the present Federally run program. The State also will continue to have lead responsibility for response and cleanup of PCB spills.

Introduction to Section II

Section II of this report is intended to serve as a management tool. It describes high priority environmental problems in Region 10, their causes and effects and current plans to solve them. It establishes the link between environmental problems and actions. In addition, Section II is intended to help Agency program managers in the Regional Office and at EPA Headquarters assess present plans, allocate resources and devise national programs to further protect and enhance the environment of the Pacific Northwest. Much of this report has been organized with these purposes in mind.

Problems have been ranked in groups according to the following criteria:

Priority 1:
Problems of concern because of possible adverse health effects to humans.

Priority 2:
Problems of concern because of possible adverse ecological affects.

Information on each problem is organized as follows:

- Problem characterization.
- Sources of contamination.
- Program implications.
  - a. Done to date.
  - b. Barriers to correction of problems.
- Proposed Strategies.
  - a. Region 10 actions needed.
  - b. Headquarters actions needed.
- Expected Results—Programmatic and Environmental, and Proposed Indicators of Progress.

Priority Regional Problems

Priority I: Potential Human Health Effects

- •Exposure to Hazardous Wastes
- •Water Supply: Contamination of Ground Water and Drinking Water Systems
- •Toxics and Hazardous Materials in Marine and Estuarine Waters
- •Pesticides and Toxic Substances
- •Air Pollution: Carbon Monoxide and Ozone
- •Air Pollution: Particulate Matter
- •Microbiological Contamination of Estuarine and Shellfish Areas

Priority II: Potential Ecological Effects

- •Fishery Damage from Contaminated Waters

Exposure to Hazardous Wastes

Problem Characterization

An estimated 2.7 million tons of hazardous waste were disposed of in Region 10 between 1940 and 1975. Generation of hazardous waste in the Region now is estimated at up to a million tons a year. Without proper management, such wastes pose a significant public health and environmental peril by direct exposure and indirect exposure through contaminated ground water or the food chain. Ground water contamination is of particular concern in Region 10 because of increasing reliance on this source for public and private drinking water.

The risk of direct human exposure to hazardous waste begins at the point of generation and continues through all phases of management, including transport, storage, treatment and disposal. Inadequately secured storage and accidental or intentional spills pose a potential threat to human health and safety. New cases occur frequently that require public supervision of the removal of hazardous material to licensed disposal sites.

Historically, hazardous waste generation and disposal occur predominantly in the most populated and industrialized areas. In Region 10 these areas coincide with those of high annual precipitation and low evaporation rates. This characteristic wet climate results in high leachate generation and resulting migration of hazardous constituents into relatively high ground water tables. In the Puget Sound area of the State of Washington, several public and private drinking water wells recently have been taken out of service due to ground water contamination by toxic organic compounds.

The wet climate also results in surface runoff and leaching of hazardous materials from contaminated soils into the abundant surface waters of the Pacific Northwest and Alaska. Several marine embayments and estuaries have accumulated lead, arsenic, and other hazardous materials to the point where the tissues and organs of bottomfish and shellfish exhibit abnormalities. Local health officials have issued health advisories cautioning persons who rely on this marine life for a food source.

In recent years, disposal sites in Region 10 have been established in dry areas; however, this "solution" to the wet-climate problem increases risks of another kind. The sites (in Arlington, Oregon, and Grand View, Idaho) are remote from many industrial areas, particularly those in Washington and Alaska. This means transportation costs are high and the likelihood of accidental spills increases with haul distances.

Hazardous waste problems in Alaska are unique. Although the number of handlers and the quantities of hazardous waste generated are relatively small, the management problems are substantial.

No commercial hazardous waste disposal facility exists in Alaska. Generators must either dispose of wastes on-site or pay very high costs to transport the wastes to facilities in Oregon, Washington or Idaho. As a result, hazardous materials that were

Preceding page blank

formerly sent to local landfills are now being "managed" on-site—often in ways that do not conform to the requirements of law.

Waste management practices at military facilities—principally in Alaska—also present problems, particularly in regard to the disposition of excess property. Equipment containing hazardous materials unwittingly has been sold as surplus, and these materials sometimes end up being released into the environment.

Sources
Under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or "Superfund"), EPA identified approximately 760 sites where past disposal practices were deemed to create potentially hazardous situations. Of these, all were screened and 15 were recently identified on EPA's national priority list for Superfund designation. The remaining sites from the list of 760 are to be investigated in Fiscal Years 1983 and 1984.

Of the 15 sites on the proposed Superfund list, five are associated with hazardous organic compounds, four with toxic metals, two with both organics and metals, two with pesticides, and one each with cyanide and radioactive waste.

Current information gathered under the Resource Conservation and Recovery Act (RCRA) indicates that, of the firms now handling hazardous waste in the Region, 1,960 are generators, 560 are transporters, and 150 are treatment, storage, or disposal facilities (TSDs). No specific information is available as to the total quantity of hazardous waste generated, treated or disposed of at or by these facilities; however, annual reports from facilities in all Region 10 states will be available to begin compiling this information during Fiscal 1983.

Of the 15 sites on the proposed Superfund list, five are associated with hazardous organic compounds, four with toxic metals, two with both organics and metals, two with pesticides, and one each with cyanide and radioactive waste.

Current information gathered under the Resource Conservation and Recovery Act (RCRA) indicates that, of the firms now handling hazardous waste in the Region, 1,960 are generators, 560 are transporters, and 150 are treatment, storage, or disposal facilities (TSDs). No specific information is available as to the total quantity of hazardous waste generated, treated or disposed of at or by these facilities; however, annual reports from facilities in all Region 10 states will be available to begin compiling this information during Fiscal 1983.

Program Implications
Done to Date: The Region 10 hazardous waste and Superfund programs are well under way. The nomination of 15 Northwest sites to the Superfund priority list followed investigations, studies or evaluations at many of the 365 sites considered as possible candidates for the list. Cleanup was accomplished at several problem sites and is underway at major Superfund sites including Commencement Bay (Tacoma, Washington), Pocatello, Idaho and Western Processing (Kent, Washington). Major achievements are described in **Section I**.

Extensive field studies were conducted to better define problems and facilitate development and implementation of cost-effective remedial actions. Region 10 trained State and Federal staff in permit compliance, requirements for the transportation of hazardous materials and emergency response procedures. The Regional Office responded effectively to several major emergencies having the potential to seriously imperil public health. In addition, an effective inspection and compliance program required active facilities to determine whether ground water was being contaminated.

Barriers: (1) Information is inadequate to define the extent of the hazardous waste problem in Region 10. (2) State and local agencies may be unable to meet the requirement that they put up 10 to 50 percent matching funds for participation in Superfund. There is also little State or local money to pay for hazardous waste program development, planning and coordination. (3) Technical expertise (geology and ground water hydrology) and staff of Federal, State and local agencies are limited and only permit response to the most pressing cleanup issues. (4) Superfund contracting mechanisms, in certain cases, are too complex to achieve the most effective and timely solutions. (5) High costs are a deterrent to meeting ground water monitoring requirements under the Resource Conservation and Recovery Act. (6) Existing hazardous waste sites are remote from many generators, particularly those in Washington and Alaska, and new sites are costly to develop. (7) Extensive safety training and equipment is required for many field activities on hazardous waste sites. (8) The lack of necessary statutory and regulatory authority at the State level hampers high priority work by EPA to authorize programs in some Region 10 states. (9) EPA lacks sufficient funds for RCRA activities.

Proposed Strategy and Expected Results
Prevent accidents and direct human exposure: (1) Continue to inspect facilities for compliance with spill prevention and containment regulations. (2) Maintain emergency response readiness through training of State and EPA personnel and continue support of the Region 10 emergency response team.

Abate problems of hazardous wastes in ground water and the food chain: (1) Clean up the contaminated municipal water supply well in Tacoma. (2) Negotiate with the States to correct hazardous waste problems at the 15 sites on the Superfund list. Provide technical assistance to assess and inspect sites, conduct responsible-party searches, and collect information to characterize problems. By the end of Fiscal 1984, complete investigations at 12 of the sites, and complete remedial measures for five. (3) Negotiate remedial work plans and cooperative agreements with the States. The Commencement Bay Nearshore Agreement with the State of Washington is now being developed. (4) Help States and/or take Federal actions to achieve voluntary cleanup at Superfund sites. With the shortage of State matching funds for Superfund, voluntary cleanup at some sites is essential. (5) Secure memoranda of understanding with Federal facilities to clean up waste problems. (6) Provide States with special Superfund financial help to complete assessments of sites with problems from past waste disposal practices. Supplement State activities with EPA resources to eliminate the backlog of investigations needed at such sites. (7) Remedy ground water contamination identified through inspections or other means.

Prevent new hazardous waste problems and exacerbation of existing ones: (1) Delegate Resource Conservation and Recovery Act program responsibilities to all States by January 1985. Provide financial and technical assistance for permitting and enforcement activities. (2) In the interim, continue aggressive Federal inspection and enforcement.

- Conduct approximately 350 inspections to identify violators.
- Take enforcement actions as necessary.
- Call for permit applications for land disposal facilities. Environmental concerns and size would be the basis for ranking facilities for permitting.
- Issue 24 hazardous waste permits, eight permits for land disposal facilities, and one permit for a hazardous waste incinerator.

- Assure that ground water monitoring networks are in place at all applicable facilities.
- Assess compliance with regulations on manifests.
- Assist military facilities in Alaska and other Region 10 states to improve hazardous-materials management practices of Defense Property Disposal Offices.

Water Supply: Contamination of Ground Water and Drinking Water Systems

Ground Water

Problem Characterization

Ground water resources in Region 10 are significant and will play an extremely large role in the Region in the future. Withdrawals of fresh water from all surface and underground sources are increasing — with a potential to rise from 30 billion gallons a day in 1970 to 60 billion gallons a day in 2020. By 1975 the withdrawal of ground water had increased 70 percent over that in 1970 and accounted for 22 percent of total freshwater withdrawal. While much of the withdrawal is presently used for irrigation, projections by the U.S. Geological Survey indicate that municipal needs for ground water will increase by more than 160 percent over the 1970 levels. The amount of ground water in "recoverable" storage is estimated at 179 trillion gallons. The average regionwide rate of ground water withdrawal in 1975 was 7,300 billion gallons a day (Geological Survey Professional Paper 13-S, 1979).

Region 10's ground water contamination log, which lists ground water contamination problems reported to the Regional Office, shows a marked increase in reports in 1981 and 1982. In the decade of the 1970's there were 31 ground water contamination reports. In contrast, in 1981 and 1982 alone, more than 46 concerns were reported. Most significant is the fact that the logging of these incidents is not the result of a routine consistent monitoring program, but rather represents problems that came to our attention without an aggressive problem-identification program.

As more data are collected more evidence of ground water contamination is found. This is of great concern as several of the more highly populated areas of the Region use ground water as a principal source of public and private drinking water. More importantly, these highly populated areas are where the contaminants of greatest concern are being discovered. Significant contamination is occurring in ground waters in Tacoma, Washington, the Spokane Valley/Rathdrum Prairie Sole Source Aquifer in Idaho and Washington, the Chambers Creek/Clover Creek Aquifer in Pierce County, Washington, the Snake Plain Aquifer in Idaho, and East Portland, Oregon.

Historically, the Region has encountered ground waters contaminated by microbiological organisms, nitrates and other inorganic compounds. More recently, volatile organic chemicals (VOC's), which are highly toxic and considered to be highly persistent in aquifer structures, have become contaminants of major concern. Both public and private drinking water wells have recently been closed due to the high levels of VOC's in the ground water. Ground water contamination from septic tanks and drainfields and shallow water-table aquifer contamination from gasoline and other petroleum products, primarily from leaks in subsurface tanks and plumbing, are being found more frequently.

Sources

The sources of ground water contamination vary by area. In many cases, the direct correlation between specific sources and the contaminants is hard to establish. For some existing ground water contamination, the sources are unknown. Contamination does, however, result from sources such as landfills, septic tanks and drainfields, drainage and disposal wells, disposal sites and industrial activity occurring over aquifers. Shallow-water-table aquifer contamination from gasoline and other petroleum products results from leaks in subsurface tanks and plumbing. Nonpoint sources, such as urban runoff, are also of concern.

Table 1 briefly describes the major areas of concern, the contaminants present and the sources suspected of causing the problems.

Table 1
Ground Water Protection Problem Areas Identified in Region 10

Problem Area	Population, Area, and Beneficial Uses Affected	Contaminants Present	Source
South Tacoma Channel* Commencement Bay, Washington	195,000 people. Public and private drinking water. City wells 12-A and 9-A closed.	1, 1, 2, 2 tetrachloroethane, 1, 2 transdichloroethylene, trichloroethylene, tetrachloroethylene.	Under investigation
[illegible]	[illegible]	[illegible]	[illegible]
Spokane and Rathdrum Prairie Aquifer and Tributaries, Idaho and Washington	350,000 people. Public and private domestic, irrigation and industrial water supply. Private wells closed. No public wells closed.	1, 1, 1 trichloroethane, trichloroethylene, tetrachloroethylene, 1, 2 transdichloroethylene, dieldrin, heavy metals (zinc), chloride, nitrate/nitrogen.	Lead smelter, electrolyte zinc plant, dry cleaners, aluminum plant, county and private land fills, septic tank leachate, river-aquifer interchange, and waste oil recycling.
[illegible]	[illegible]	[illegible]	[illegible]
Snake Plain Aquifer, Idaho *Potential Areas of Concern*	200,000 people. Drinking water recharge for surface water and irrigation. No wells closed.	Coliform bacteria, turbidity, 2,4-D, pentachlorophenol, dieldrin, pentachloronitrobenzine, chlordane, nitrates, chromium, tritium.	*Probable:* irrigation water disposal wells, and industrial waste from ponds and injection wells at energy laboratory.
[illegible]	[illegible]	[illegible]	[illegible]
Kent, Washington	Ground water and drinking water for Kent.	Organic toxicants and heavy metals.	Western Processing
[illegible]	[illegible]	[illegible]	[illegible]

*These two areas are technically within the Chambers Creek/Clover Creek Aquifer.

Program Implications

Done to Date: Region 10 currently has a two-pronged approach to deal with ground water contamination. The first is preventive, the second is remedial. Region 10's emphasis on preventing ground water contamination relies on: (1) Water quality management planning to assist in identifying and solving primarily nonpoint-source related problems. Several Section 208 grants were originally directed at preventing toxic contamination of ground water from urban runoff. (2) The "sole-source" aquifer designations to protect unique sources of drinking water. There are three aquifers in Region 10 that have been designated as sole-source aquifers. The Region is currently reviewing a petition for a fourth designation for the Snake Plain Aquifer. In these areas, construction projects with polluting potential and which receive Federal financial assistance are subjected to a special EPA review to make sure contamination does not occur. (3) Permitting and monitoring activities under the Resource Conservation and Recovery Act (RCRA) to ensure that ongoing activities in generating and storing hazardous wastes will not contribute to future ground water contamination. A ground water monitoring network is required as a permit condition at active solid and hazardous waste facilities that might impact ground water. (4) Limited spot monitoring of ground water resources in highly populated areas to ensure that contamination is not occurring. However, the Region does not have a well established routine monitoring program to provide a consistent early warning system. (5) Solid waste planning and management as conducted by State agencies. The Region relies on the States' solid waste management programs to anticipate and prevent ground water contamination from solid waste handling. (6) Sewage treatment plant construction and adequate operation and maintenance. Sewer systems are being built over vulnerable aquifers, such as the Spokane and Chambers Creek/Clover Creek aquifers. These systems will minimize leaching of toxic chemicals into the ground water. (7) The underground injection control program is just getting underway. Because there are 20,000 or more Class V (unregulated) wells in the Region, their potential for ground water contamination is of great concern. Region 10 is delegating the underground injection control program to Oregon and Washington and has begun to set up EPA-run programs for Alaska and Idaho, and for Indian lands throughout the Region.

In terms of remedial actions, the Region relies on limited site-specific monitoring to identify problems. Once contamination has been documented, the Region initiates follow-up either under Superfund or other statutory authority. When appropriate, the Superfund program pursues case development, enforcement, remedial action and treatment to correct the problem in each case. Region 10 has 15 sites that were ranked among the 418 sites proposed for Superfund. In 11 of the 15, ground water contamination was a major reason for the high ranking. EPA works closely in all cases with local and State agencies to develop cooperative agreements to ensure adequate protection of public health and to find additional sources of drinking water where shortages may occur as a result of well closures. Intensive monitoring and cooperative investigations involving local health departments, State agencies and EPA have been conducted in Washington and Idaho.

EPA funding and technical assistance have been provided for well drilling in several areas to determine the extent and sources of ground water contamination.

The Superfund list is viewed as dynamic, to be updated routinely so remedial actions will be taken as needed. Superfund strategies are being developed and implemented for the Tacoma, Kent and Yakima, Washington, ground water problems and the Troutdale Aquifer in Vancouver, Washington. A comprehensive description of Superfund activities is provided in the section on "Exposure to Hazardous Wastes."

The Region also maintains a ground water contamination log identifying reported cases, possible causes and follow-up actions. This allows us to keep a historical record of problems as well as to track the effectiveness of follow-up activity.

Barriers: The implementation of an effective ground water protection program faces many varied barriers that require concentrated effort to overcome. These barriers are briefly summarized below.

Prevention:

- The lack of a clear, well understood national policy on ground water. The Regional Office has been reluctant to develop a ground water strategy until the national policy is published to ensure consistency with the national direction. A particular problem is the lack of an agreed definition of who has jurisdiction over ground water resources and a lack of understanding on the part of elected officials and other decisionmakers of the need for preventive management approaches to ground water protection.

- Available staff expertise in ground water hydrology and geology at the Federal, State or local levels only permits response to the most pressing cleanup issues rather than to prevention of problems.

- Reductions in funding levels and priority of water quality management planning. The reduced funding levels hamper the States' ability to develop site-specific plans and nonpoint-source controls for important ground water areas.

- The Resource Conservation and Recovery Act program is complicated and difficult to administer. The complexity of the program has kept it from getting up and running quickly. Limited resources at the State and local levels have delayed delegation of the program.

- The lack of a routine ground water monitoring program impedes consistent identification of problems. To set up a routine monitoring program would be extremely costly and would require more resources than are available at the State and EPA levels.

- EPA has no program to address ground water contamination problems caused by conventional solid wastes.

- The underground injection control program has developed slowly. Consequently, little has been done to assess and regulate pollution from Class V wells. Also, the absence of specific programs to control pits, ponds and lagoons hinders Federal control of these potential sources of contamination.

Remedial:

- There are no EPA standards for organics in drinking water; hence there is no benchmark for evaluating the severity of the problem.

- The sources of pollutants are difficult to trace and to link to aquifer contamination. In addition, the costs of exploration, well monitoring, case development and enforcement are high. Therefore, activities to determine the sources of pollutants and develop remedial actions often cost more than State and local agencies can afford. The States also have difficulty meeting match requirements for the Superfund program.

- Restrictions on the use of Superfund contractors, in certain cases, limit the most effective and timely solutions to the problems. In some instances, solutions could be better developed using a local contractor rather than the national level-of-effort contractor. Regional Offices do not have the freedom to do this.

Proposed Strategy

Regional Actions: Region 10's proposed strategy for ground water protection follows the existing two-pronged approach of concentrating on prevention and on cleaning up existing problems. The Region intends to provide more coordination between the individual programs by forming an interdivisional ground water coordination team with representatives from the involved programs. This team will meet routinely to review progress and program activities for effectiveness, consistency and compatibility.

Region 10 will develop, with States, ground water strategies based on a national ground water policy. The Region asked in its Fiscal 1984 guidance that ground water strategies be developed or updated in each State. These State strategies will be incorporated into a Regional ground water strategy to be completed by the end of Fiscal 1984.

Region 10 will continue to work in individual program areas to prevent contamination of ground water: (1) Annual implementation reviews will be conducted on water quality management plans to make sure that control programs are being implemented and are working. New water quality management funds available under Clean Water Act Sections 205(j) and 106 may be directed toward high priority ground water areas. (2) Region 10 will act on the Snake Plain sole-source aquifer petition and will review federally aided projects that might contaminate designated aquifers. (3) Region 10 will work expeditiously to delegate the Resource Conservation and Recovery Act programs to the States and to get these programs up and running as quickly as possible. (4) Region 10 will analyze existing monitoring programs, seeking to develop a systematic ground water monitoring program that will help identify problems early. The Region will provide technical assistance, particularly in laboratory analysis, to municipalities that collect ground water and drinking water samples. The emphasis will be placed on municipalities that serve large numbers of people with drinking water from ground water sources. (5) The Region will supply technical assistance, as requested, to State solid waste programs in high priority areas such as the Kent Highlands. (6) Region 10 will work with Oregon and Washington to develop an effective delegated underground injection control (UIC) program. The Region will be responsible for developing and managing the UIC program in Alaska and Idaho. Permits, where required, will be issued in 1984. The Region will conduct an inventory and a thorough assessment of the water quality impacts from Class V wells, as necessary. The State agencies in Oregon and Washington will conduct this assessment during Fiscal Years 1984-1986.

For remedial actions, the Region will rely heavily on Superfund to pay for cleanup activities. Individual control strategies will be implemented for each designated Superfund site. As necessary, site-specific enforcement action will be taken. For contamination problems not related to Superfund sites, the Region will help State and local agencies determine the extent of the problem and the causes. Technical assistance in the form of laboratory analysis and on-site reviews will be provided as resources allow. Region 10 will petition Headquarters to establish alternatives to the level-of-effort contractors when a local solution can be justified as cost effective and more timely.

Table 2 provides a brief summary of site-specific actions and control strategies for the high priority areas identified in Table 1.

Table 2
Ground Water Protection Actions to Date and Strategies in Region 10

Problem Area	Existing Actions	Control Strategy
South Tacoma Channel Commencement Bay, Washington	Designated Superfund site. Sampling and pump testing. Drilled nine shallow wells, one deep well. Remedial feasibility investigation for well 12-A. Surface investigation of sources.	Continue source identification effort. Develop enforcement cases. *Remedial Action:* Well 12-A this summer will receive additional treatment.
[illegible] Commencement Bay, Washington	[illegible] of potential waste shortage.	[illegible] action in cooperation with local and State agencies. Detailed strategy [illegible]
Spokane and Rathdrum Prairie Aquifer and Tributaries, Idaho and Washington	Designated sole-source drinking water aquifer. Management plan developed under Clean Water Act Section 208. Three proposed Superfund sites: Arrcom Corporation, Kaiser Aluminum, Colbert landfill. $80,000 spent under the Resource Conservation and Recovery Act to analyze problems associated with Colbert landfill, and $30,000 spent for ground water monitoring. (29 wells in 1979). Comprehensive waste management plan with Environmental Impact Statement by EPA.	Follow up on proposed Superfund designation. Determine possible action in cooperation with local and State agencies. Detailed strategy being developed.
[illegible] Aquifer, Washington	[illegible] program under Section 201 of the Clean Water Act. Public drinking water program. Aquifer assigned high priority under State-EPA Agreement. Hydro-geologic study initiated by Pierce County under $400,000 State grant.	[illegible] Construct sewage system, implement management plan, act on proposed Superfund site, continue cooperative cleanup efforts with industry (Kaiser). Develop State underground injection control program. State to review on-site waste management system, develop statewide ground water management strategy to be coordinated with State waste discharge and solid and hazardous waste disposal permits. [illegible]
Snake Plain Aquifer, Idaho	Considering designation as a sole-source aquifer. State Department of Water Resources is developing alternatives to irrigation disposal well practices.	Coordinate with Superfund activities in South Tacoma Channel and Lakewood. County is conducting a hydro-geologic study of aquifer and will design an on-going data collection program. Action to be determined after study is published.
Potential Areas of Concern		
[illegible]	Proposed Superfund site	Act on [illegible] designation. [illegible]
Kent, Washington	Proposed Superfund site	For all cases, act on proposed Superfund designation. Investigate problem and take appropriate action.
[illegible], Washington	Two proposed Superfund sites	

Headquarters Action Needed: (1) Publish a policy, clearly laying out EPA and State responsibilities for protecting ground water and defining relationships between Federal, State and local agencies. Headquarters action also is necessary to resolve the conflict with Superfund regulations on the future uses of ground water, determine the appropriate lead EPA office and identify how the effort will be budgeted. (2) Develop a process to provide an expedited evaluation of Class V wells under the underground injection control program, along with mechanisms for control in problem areas. (3) Develop drinking water standards for volatile organic chemicals. (4) Refine design parameters for application of treatment methods such as aeration towers and granular activated carbon to remove volatile organic contaminants. Design considerations such as multiple contaminants and intermittent operation need to be addressed. (5) Establish mechanisms to let Regional and State agencies develop appropriate uses of contractor support on a case-by-case basis.

Expected Results

Region 10 expects to delegate the underground injection control program to Oregon and Washington and establish an EPA-managed underground injection control program in Alaska and Idaho. The Region also will develop ground water strategies with the States and act on a petition seeking sole-source designation for the Snake Plain aquifer in Idaho.

Progress in the ground water area would be measured by the number of injection wells brought under permits, reduction in the number of persons served unsafe drinking water from ground water sources, and the continued availability and use of ground water as a source of drinking water.

Drinking Water Systems

Problem Characterization

Region 10 historically has been blessed with plentiful sources of raw water suitable for drinking without the need for extensive treatment.

As a consequence, large public and private investment in water filtration and disinfection facilities has not occurred. As the population and economic activity of the Region have grown, so has the incidence of contamination of water sources.

The incidence of waterborne diseases in the Northwest is among the highest in the country, according to the USPHS Communicable Disease Center. Water supplies heretofore considered safe are now known to be contaminated with potentially harmful microorganisms and/or chemical contaminants.

In some cases this problem can be and has been alleviated by switching to alternate uncontaminated raw-water sources. Increasingly, however, this option is disappearing and the installation and operation of treatment facilities has become a necessity to assure safe water supplies. Considering the Northwest's long history of minimal treatment, EPA's task of convincing the public and its elected officials of the necessity to appropriate funds for safe drinking water purposes sometimes is difficult. Weak economic conditions in the Northwest compound this problem.

Consistent with EPA policies, Region 10's basic approach to dealing with unreliable water systems and potentially unsafe water is to help the States build aggressive programs to solve drinking water quality problems. Three States—Alaska, Idaho and Washington—have achieved delegation and are now receiving technical and financial assistance from EPA and are making good progress to date. Oregon has chosen not to accept delegation of the drinking water program. As a result, direct EPA action has been necessary in Oregon since 1977.

Sources

The source of major health problems in this program are inadequate treatment or protection of raw and finished water and inadequate operation and maintenance of water systems.

A more detailed analysis of state-by-state compliance is provided in Attachment A.

Program Implications

Done to Date: The Region 10 and State strategy for improving drinking water quality varies according to the situation in each State. The public water supply program has been delegated to the States of Alaska, Idaho and Washington. EPA manages the program in Oregon. Major accomplishments in this effort are discussed in **Section I**.

Actions to date in the drinking water supply program have concentrated on several program areas to ensure adequate health protection. These include: (1) Municipal funding programs (grants and/or loans) now are available in Alaska, Oregon and Washington. Idaho lacks such a program. Region 10 also has been able to influence other Federal granting agencies, i.e., the Farmers Home Administration and the Department of Housing and Urban Development, to provide money for improvement of water systems. (2) Enforcement is getting more attention. Administrative and/or judicial enforcement actions in Fiscal 1982 totaled 179 regionally. (3) Programs for operator training and certification are operating in all four states. (4) Region 10 and the States encourage the use of the highest quality raw water and source protection, wherever possible, rather than sophisticated treatment. (5)Monitoring and surveillance activities are being increased to identify systems with water quality problems. (6) Regionalization of water systems is being encouraged. This would result in the creation of larger systems with greater capability to afford facility improvements and proper management and operation.

Barriers: The major barriers differ somewhat state-by-state; however, in general, concerns are in four areas: (1) Limited financial capability to make system improvements. (2) Unwillingness on the part of the system owners to make improvements. (3) Untrained or insufficient numbers of system operators. (4) High operation, maintenance and laboratory costs.

Proposed Strategy

Regional Actions: The control strategy to ensure compliance with drinking water regulations concentrates on continuing an effective program planning and annual review process through the State/EPA Agreement and work planning. EPA will continue to emphasize the need for each State to have an aggressive program. Annual strategies are implemented with Alaska, Idaho and Washington under the State/EPA Agreement. Where violation rates continue high, EPA will strengthen overview of State programs.

Region 10 has also developed a strategy for the drinking water program in Oregon. It consists of three major approaches: (1) Identify and obtain commitments to upgrade all substandard and potentially dangerous water systems in the state. (2) Help the State develop an improved drinking water program with emphasis on data handling, disease investigation and reporting, operator training and certification, laboratory quality assurance, and technical and administrative program development. (3) Conduct a public information program by issuing press releases on persistent water quality violators and emergency advisories, developing reports on statewide drinking water quality, and responding to inquiries on the status of EPA's program and the requirements for delegation.

Headquarters Action Needed: (1) Research into drinking water treatment technology for small water systems to emphasize "low technology" and energy efficiency. The small populations served by many of the water systems that violate the national drinking water standards generate limited revenues. This makes low-cost, simple-to-operate technology mandatory if these systems are to provide treatment necessary to assure safe drinking water. (2) Revise drinking water regulations to reduce low priority water quality monitoring requirements. With several years of water quality history now available, it seems reasonable to reduce monitoring requirements for several noncritical contaminants. This would let systems use their resources to solve problems and monitor for newly identified contaminants.

Expected Results

Region 10 will improve water system compliance with drinking water regulations, giving highest priority to the most serious threats to public health; extend the coverage of the trihalomethane regulation to water systems serving over 10,000 persons and ensure that the microbiological quality of the water is fully protected in the process; and encourage greater commitment by the State of Oregon to safe drinking water by urging the State to: (a) establish a more aggressive drinking water program, and (b) assume primary responsibility for the program.

Progress would be measured by improvement in the percentage of systems that meet drinking water standards, the decrease in population exposed to excessive bacterial levels (22,000 in 1982) and the decrease in population exposed to excessive turbidity levels (113,000 in 1982).

Toxics and Hazardous Materials in Marine and Estuarine Waters

Problem Characterization

The Region 10 shoreline of Oregon, Washington and Alaska runs 35,819 miles. Much of the economy of the Northwest depends directly or indirectly upon marine resources. The quality of Northwest lifestyle also is heavily dependent on marine water.

Toxic contamination of urbanized marine and estuarine areas along this shoreline is a major concern. The present focus of this concern is the Puget Sound area of Western Washington. This is the most urbanized coastal area in the Region. Problems found in the Sound are expected to be found in other areas of urban-industrial development, in varying degrees. Recent studies conducted by the National Oceanic and Atmospheric Administration (NOAA) have documented alarming rates of abnormalities among bottomfish and shellfish from marine waters adjacent to areas of concentrated urban and industrial development in Puget Sound. (Source: "Chemical Contaminants and Abnormalities in Fish and Invertabrates from Puget Sound:" Malins et al: NOAA Technical Memorandum OMPA-19. As an example, English sole in Commencement Bay were found to suffer liver neoplasms at an 8-12 percent rate and necrotic lesions at an 18-20 percent rate. Background in all cases is zero.) The flesh of these fish was found to be tainted with toxic and carcinogenic substances. Additionally, bioassays of bottom sediments from these areas show increased toxicity to marine benthic organisms.

The public has become alarmed by these findings. Concerned health officials have issued warnings regarding the human consumption of bottomfish and must decide whether or not to allow sport fishing in contaminated areas. State and EPA officials are faced with the problem of identifying the sources of toxic contaminants and controlling them. Also of concern to environmental officials are possible longterm, cumulative effects of toxic contaminants. Available data indicate a large number and wide range of contaminated sources discharging to marine waters (e.g., municipal and industrial discharges, storm runoff, atmospheric deposition, rivers, ground water inflows, etc.). Complicating the problem is the knowledge that physical and chemical processes in the Sound redistribute contaminants from their original point of entry. Where they ultimately accumulate is not known for certain, but evidence to date strongly suggests they are not being carried out to the open ocean.

Another problem associated with marine water pollution is the inadequacy of our present water quality monitoring system. Until recently, marine water quality data collected by environmental control agencies focused primarily on traditional pollutants such as bacteria and oxygen-demanding wastes. As a consequence, the emerging toxics problem largely went unrecognized. The chemical and biological data needed to establish well defined cause-effect relationships are inadequate.

All the while, circumstances are forcing decisions on regulatory officials. Should fishing be banned in certain areas? Should National Pollutant Discharge Elimination System permits be revised to include more stringent limitations on toxics? What should be limited? To what level? Should waivers under Section 301(h) of the Clean Water Act be granted? (We have received 24 applications in Puget Sound.) What provisions should be included if the waivers are granted? To what extent are past practices responsible for the pollution? Where should enforcement be pursued? A process of optimization is clearly needed given the inherent complexity of the problems, a sparcity of data and resources available and the short time available before decisions must be made.

Pollution control and prevention actions until recently focused on traditional approaches, controlling municipal and industrial discharges by building wastewater treatment facilities, correcting sewer overflows, setting permit limits on discharges and developing management practices to control urban runoff. The effectiveness of these abatement and control programs needs to be reevaluated in light of the growing awareness and concern about toxics contamination. It may be necessary to adjust the existing programs or develop new approaches.

Sources

Puget Sound is the recipient of innumerable discharges—municipal, industrial, nonpoint, natural and ground water. Many of these discharges contain toxic and hazardous materials. The long-term, cumulative impact of these discharges to Puget Sound is of grave concern to the Regional Office. While each bay area and industrial discharge is analyzed separately, they must also be viewed in total.

The significance and severity of the problem, in part, result from the fact that the major industrial bays in Puget Sound are in major metropolitan areas such as Seattle and Tacoma. Contaminants range from highly toxic and very persistent materials such as polychlorinated biphenyls to heavy metals.

Toxics and hazardous material problems in urban bays generally can be attributed to the following categories of sources:

- Nonpoint-source, surface runoff, or leachate from river delta filling. Many industrial dischargers are on fills.
- Past and/or present point-source industrial discharges from major industries such as pulp and paper, chemical manufacturers and oil refineries.
- Disposal of contaminated dredge material.
- Point-source municipal discharges.
- River inflow.
- Combined sewer overflows.

Table 3 briefly describes the major urban industrialized bay areas in Puget Sound presently under intensive investigation in Region 10.

Table 3
Contaminated Marine Estuarine Embayments in Region 10

Problem Area	Population, Area, and Beneficial Uses Affected	Contaminants Present	Sources
Commencement Bay, Washington	150,000 people. *Inner Bay:* Fish migration and rearing; oyster, clam, mussel harvesting. *Outer Bay:* Above uses plus shellfish spawning, rearing and commercial harvesting	*Inner Bay:* Polychlorinated biphenyls (PCB's), hexachlorobutadiene, toxic chemicals and metals, arsenic, excessive fecal coliform, other unidentified organics. In all parts of the inner bay, fish have been found to have tumors. *Outer Bay:* Toxic metals (lead, arsenic, cadmium, mercury, nickel, PCB's, chlorinated butadienes, arsenes).	*Municipal:* One *Industrial:* 23 *Nonpoint:* Contaminated soil, fill, and urban runoff. Others unidentified.
[illegible]	[illegible] Fish migration, rearing, spawning, harvesting shellfish, recreation, waterborne commerce. Impaired Uses: Primary contact recreation, fish rearing. Low dissolved oxygen. Fish [illegible]	[illegible] PCB's, polynuclear aromatics, un-ionized ammonia, heat	[illegible] of the Duwamish River at low flow.) *Industrial:* 32 *Nonpoint:* Contaminated fill and urban runoff.
Everett Harbor, Washington	Fish migration, rearing, spawning, waterborne commerce	Chromium, copper, zinc, organic contaminants, many unidentified.	*Municipal:* Two. *Industrial:* Seven. *Nonpoint:* Agricultural and urban runoff.

Program Implications

Done to Date: Work on toxic contamination of urbanized marine and estuarine areas has focused on bays in Puget Sound as examples of problems expected to be found elsewhere. EPA and the State of Washington recently began a Puget Sound Study to help direct multi-agency resources toward identifying and solving problems, as well as looking at cumulative impacts of pollution on Puget Sound.

Several actions have been taken so far in urban industrial bays in Puget Sound to develop solutions to the problems of toxic and hazardous materials in marine and estuarine waters. EPA has detailed an employee to the State of Washington to coordinate the Puget Sound study. Its findings also will assist the State and EPA in future 301(h) permit reissuance decisions.

Barriers:

Resources

- Technical expertise and staff resources of Federal, State and local agencies are inadequate.
- Funding to develop and implement control programs are inadequate.

Institutional

- There is a very large number of State, Federal, and local agencies involved because of the size of Puget Sound as well as the differing jurisdictions. We haye not, to date, reached agreement on who has responsibility for what.

Technical

- EPA and other agencies are only on the fringe of understanding the technical cause-and-effect relationships associated with toxic contaminants in the estuarine environment.
- Complexity of marine, estuarine environmental factors complicates the limited technical understanding of the numerous interactions occurring.

Proposed Strategy

Regional Actions: A two-pronged strategy for dealing with toxic contaminants in Puget Sound is proposed. The first deals with problems of managing waste discharges and new development to minimize future problems with the cumulative effects of toxic contaminants on the Sound as a whole. The management approach involves assessing existing contaminant levels and wasteloads, developing improved tools for predicting impacts of future activities, and establishing an appropriate set of standards or interim target levels for chemical contaminants and/or biological effects against which projected impacts will be evaluated. EPA and the State Department of Ecology have begun work to summarize all available information on these subjects. This study will identify gaps in data and available models relative to future water quality management needs. Based on this evaluation, work will begin to plug these gaps. The total time to completion is two to three years. Proposals for a longer-term interagency monitoring program will also be developed in this period.

Water quality monitoring and management in Puget Sound involves agencies at all levels. Effective coordination and integrated planning are essential to get the most benefit from the limited resources available. In addition to its technical work, the State will establish an interagency framework for technical and management coordination.

The second part of the toxic-contaminant strategy deals with existing problems in urban industrial bays and reflects several developments of urgent public concern. The National Oceanic and Atmospheric Administration has found elevated levels of diseased fish and shellfish in these areas. Sediments in these bays are heavily contaminated with a wide variety of organic and inorganic pollutants. There is significant concern about potential human health effects due to consumption of contaminated fish, and about the effects of contamination on the marine resources of the Sound.

To address these problems, priority embayments have been identified. In Commencement Bay and Elliot Bay, a significant amount of work on problem definition and waste-source identification has been completed or is already underway. In other areas only minimal information is available. For each of these bays a coordinated, interagency action plan will be developed taking into account the current status of information and regulatory action. First priority will be to clearly define the extent and nature of contamination and current waste discharges. If current discharges are significant, appropriate regulatory actions by the State or EPA will be initiated. If historical discharges are the primary problem, the feasibility of appropriate remedial actions will be evaluated.

The lack of water quality standards for toxic substances and the lack of sediment standards hinders the establishment of clear target levels to guide waste-treatment and remedial action decisions. During the next year EPA, the State Department of Ecology, the National Oceanic and Atmospheric Administration and other agencies will develop criteria for establishing interim standards or targets. Efforts will be made to determine background levels and then set appropriate targets in relation to these levels.

To deal with questions of health risk, the Department of Ecology will work with the State Department of Social and Health Services and local agencies to improve the current information base. As a first step an evaluation of catch and consumption patterns will be conducted. This work will help tell whether tissue contamination data is needed in other areas.

To manage both the cumulative-effects and the urban-bays parts of this strategy, the State and EPA have a steering committee of top managers to direct the work. The overall strategies are interagency in nature, however, and major involvement by other key agencies in both the planning and implementation phase is anticipated for bays where there is biological-impact data. There are several other urban bays where similar problems are suspected. Next on the schedule for investigation are Bellingham Bay and Sinclair Inlet.

Individual area control strategies are listed in Table 4.

Table 4
Contaminated Marine Estuarine Waters: Past Actions and Control Strategies.

Problem Area	Existing Actions	Control Strategy
Commencement Bay, Washington	Inner Bay designated as Superfund site; cooperative agreement with State being developed. Extensive chemical and biological monitoring; ground water studies. major industrial sources surveyed. Past practices surveyed. Investigations in industrial waterways. Notice to responsible parties. Control combined stormwater overflow. Act on Tacoma 301(h) waiver. Develop implementation strategy.	Complete cooperative agreement with State. Scoping of agreement in March. Cooperate with industry as appropriate on remedial actions. Monitoring to identify other organic contaminants.
[redacted]	[redacted]	[redacted]
Everett Harbor, Washington	Developed stormwater utility to control runoff. Local agency (SNOMET) developed Section 208 water quality management plan. Sample and characterize pulp wastes.	Continue monitoring. Coordinate with State and National Oceanic and Atmospheric Administration on intensive surveys. Snohomish County to develop comprehensive drainage plan.

Headquarters Action Needed: (1) Commitment from the EPA Office of Research and Development (ORD) for research and technical assistance in Fiscal 1983 and beyond. (2) Emphasis on research on the effects of trace contaminants in fisheries, and health effects. (3) Provide contract dollars to let the Region support, complement and cooperate in areas identified in the State/EPA integrated strategy for Puget Sound. As the strategy develops, EPA must be able to carry its share. (4) Provide water quality management funding to develop nonpoint-source controls and to support chemical and biological investigations.

Expected Results

In addition to the bay-specific actions described in **Table 4**, Region 10 expects to participate in and implement the recommendations of the Puget Sound Study. Environmental indicators would include:

- Reduced fish abnormalities and reduced health warnings for fish consumption.
- Reduced toxics contaminants levels in urban industrial embayments.
- Prevention of long-term cumulative impacts on Puget Sound.
- Maintenance of healthy ecosystems and biota.

Pesticides and Toxic Substances

Problem Characterization
Agriculture and silviculture are major employers in the Pacific Northwest. One in every six jobs in the region, on the average, is tied to agriculture or silviculture—and this is three times the rate for the U.S. as a whole. These industries are intensive users of chemicals. The EPA's pesticide program is intended to ensure that the use of pesticides does not adversely effect human health, and that other harmful environmental impacts are minimal. Because of the variety of chemicals and types of sources covered by the pesticides and toxic substances programs in Region 10, and the difficulty of describing them generically, this paper provides a sampling of representative problems with which the Regional Office deals regularly.

An extraordinarily large number of chemicals used in Region 10 are applied with special-commodity exemptions under Section 18 of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). About 75 such exemptions were in effect for chemicals used in Region 10 this year. Efforts to avert or correct adverse human health or environmental effects from such uses present varied and unusual problems.

Adding to the complexity is the fact that relatively unrestricted land-use development places suburban homes immediately adjacent—without buffering—to orchards and other farmland where these chemicals are used.

The herbicide 2,4-D is widely used for weed control on wheat. During the past decade, grape growing has increased significantly in Washington in conjunction with a rapidly expanding wine industry. Vineyards are often in the same general locale as wheatfields, usually east of the Cascade Range. The sensitive grapes are damaged each year by long-range drift of 2,4-D in the general air mass of the Columbia Basin and lower Yakima Valley. One of the most frequent complaints addressed by the Washington State Department of Agriculture has been this sort of damage.

Another problem related to crop damage in Region 10 is caused by drift of Dinitro and other dessicants onto nontarget crops. These compounds are used for weed control and crop cultivation, but affect other plants with which they come in contact.

Wildlife contamination is a serious problem in some areas. Monitoring of upland game birds by State and Federal agencies has revealed that quail and other game birds near orchards in Eastern Washington often contain high residues and suffer significant mortalities from the pesticide endrin. This pesticide is used by orchardists to control mice that destroy trees by eating their bark during winter when other food is scarce. Raptors and other predators also suffer from endrin contamination. In a 1982 U.S. Fish and Wildlife Service study, 91 dead birds of 18 species were collected near Wenatchee orchards. When the brains of 73 of these birds were analyzed for pesticide residues, 47 percent had lethal levels of endrin (greater than .8 parts per million) and 8 percent were in the danger zone above .6 parts per million.

Persistent organochlorines have been found at alarming levels in wildlife in the Columbia Basin, according to the U.S. Fish and Wildlife Service and other monitoring programs. Until recently, heptachlor was used on seed grains for wireworm control—and was being found in waterfowl—but recent State restrictions on heptachlor use appear to be correcting this problem. The origin of other birds' contact with various persistent substances is difficult to determine, due to their migratory habits. Migratory waterfowl and other birds typically spend their winter in Mexico or Central America, and spend the summer in Canada, passing through Region 10 only during the fall. An inference as to the source may be drawn from studies in Washington, Oregon and Nevada of the black-crowned night heron. These birds have been studied during the past decade as an indicator species. The heron, the whiteface ibis and numerous species of West Coast insect-eating birds recently have been found to have extremely high levels of DDT in their tissues (up to 230 parts per million in the brain, 50 ppm in eggs). This finding is directly correlated with declining reproductive success. These birds are believed to get most of the DDT during winter in Mexico and Central America.

Other episodes of acute wildlife poisonings are usually due to agricultural uses of organophosphate insecticides. During the spring and summer of 1982 alone, poisonings were attributed to the use of methamidophos (hundreds of rare sage grouse in south central Idaho), misuse of diazinon (Canada geese and songbirds in the Yakima, Washington, area and elsewhere) and parathion (geese near Ontario, Oregon). Coumaphos has been implicated in the death of hundreds of widgeons. Chemicals used to control starlings at cattle feedlots have killed thousands of nontarget birds since 1976. The carbamate insecticide furadan also is implicated in large-scale waterfowl killings throughout the country. Nongame birds also are affected by use of pesticides. The U.S. Fish and Wildlife Service estimates that, since the introduction in 1968 of the organophosphate famphur to kill cattle grubs, the Western population of magpies has declined by more than 45 percent. A toxic metabolite of famphur is believed to reach the magpies through the cattle feces, in which the magpies scavenge.

Contamination of edible or marketable commodities may be caused by the feeding of contaminated materials to livestock. More subtle causes are improper use of pesticides or an insufficient period between application of the pesticide and harvest. Other sources can be transportation related, as in the case of a recent episode involving the tainting of a candy shipment with leaking polychlorinated biphenyls (PCBs) during transit. Another situation would be the Pierce Packing incident in Region 8, in which PCBs from a transformer contaminated large quantities of poultry feed shipped into Region 10. The result was a multi-agency, nationwide task force to identify and confiscate PCB-contaminated feed, poultry, eggs, and processed foods.

PCBs also pose a potential threat to the Northwest environment. PCBs and organochlorines have been reported by the U.S. Fish and Wildlife Service in Columbia River sturgeon. While more needs to be learned about sturgeon, PCB levels found in the sturgeon eggs would have been lethal in salmonid eggs. The PCB levels were found to increase as samples were taken upriver to McNary Dam. PCBs also are believed by the Fish and Wildlife Service to be responsible for the decline of Columbia River mink and otter.

The difficulty in responding to the unusually specific mention of PCB control in the Toxic Substances Control Act (TSCA) is apparent from the speed with which EPA can be certain that these chemicals have been removed from the environment. The universe of sites considered for PCB inspections is more than 15,000, including food and feed facilities, Federal installations, utilities, scrap-metal dealers, and a variety of other industries that use large amounts of electric power. At the present rate of inspections, it could be several hundred years before all presumed sources of PCB contamination in Region 10 will be inspected.

There are more than 4,000 public schools in Region 10 and an undetermined number of private and parochial schools that must comply with regulations requiring inspection for asbestos. The Regional Office also is aware of about 80 facilities that are primary producers or processors of asbestos. The use of friable asbestos poses a direct exposure to a known human carcinogen.

Sources
The sources of pesticide contamination include farmers and operators of agriculture- and silviculture-related activities, the users, applicators, transporters, and formulators of chemicals intended to kill specific target species. These activities are virtually everywhere in Region 10, geographically the largest of EPA's regions, and not all of the problems are caused by misuse as it is currently defined.

The general problem of improper use of pesticides and toxics can be attributed to human error, such as spills, improper mixing, and so forth. The problem can be divided into four subsets:

- Damage to sensitive crops from herbicides
- Contamination of wildlife by persistent chemical residues.
- Contamination of edible or marketable commodities by chemical residues.
- Exposure of human populations either directly or indirectly through the food chain.

PCBs, as noted, are found at facilities that use relatively large amounts of electric power. Asbestos that concerns EPA is principally found in schools.

Program Implications

Done to Date: Most enforcement of the Federal Insecticide, Fungicide and Rodenticide Act is carried out by the State lead agencies (usually départments of agriculture), which have authority to be more stringent than Federal regulations require. The Washington State Department of Agriculture, in an attempt to decrease grape damage induced by 2,4-D, has placed stringent restrictions on the herbicide. Oregon is making selective attempts to limit high volatile esters of 2,4-D in counties that adjoin Washington.

Washington State University and the U.S. Department of Agriculture Extension Service have conducted residue monitoring for atmospheric 2,4-D for many years. In 1982, EPA's Corvallis Research Lab conducted a chamber microcosm study that mimicked conditions and 2,4-D applications in the Columbia basin. The Corvallis study showed that even the low volatile 2,4-D may still be causing problems. Data from this study may support changes in registration of the product.

State actions to reduce wildlife contamination include the recent additional restrictions on many uses of endrin by the Washington State Department of Agriculture. The State Department of Social and Health Services, at the suggestion of the State Department of Agriculture, has issued precautions for eating certain types of upland game birds and waterfowl from areas where endrin may be a problem.

The U.S. Fish and Wildlife Service is conducting research to identify and quantify contamination due to orchard use of endrin, as well as other rodenticides such as diphacinone.

Several actions have been taken to minimize the danger of chemical contamination of foodstuffs. Regulations prohibit the use of PCB transformers in food processing facilities after October 1, 1985, and require routine monitoring of such transformers until then. Food and Drug Administration inspectors check for PCB contamination during routine inspections, and EPA is including food processing facilities in its schedule of PCB inspections.

Compliance monitoring at utilities, hydroelectric dams and various industries have noted and eliminated violations that could result in environmental contamination from PCBs.

The Region also provided extensive formal training on PCB inspections under the Toxic Substances Control Act to 23 EPA employees in Seattle and in EPA's operations offices in each of the four states of Region 10. The resulting integrated inspection program allowed the Region to increase total PCB inspections by a factor of three during Fiscal 1982.

The Regional Office worked with the military command in Alaska to bring voluntary correction of numerous PCB violations at Army and Air Force facilities. The Department of Defense is improving its systems and EPA will monitor the systematic phaseout of PCBs from Alaska commands.

Regional staff also worked with public and private schools to assess and correct problems that previously resulted in exposing students and faculty to asbestos particles from deteriorating building materials.

Barriers: (1) Lack of manpower at the field inspector level to ensure compliance with various laws, and to provide technical assistance, both at the Federal and State levels. (2) The need to fight "brushfires" of public concern regarding specific use of a pesticide or other toxic substance, rather than addressing problems more systematically. (3) Funding cutbacks in laboratories capable of pesticide residue analysis. EPA has discontinued support for the Idaho and the Washington Epidemiologic Study and Pesticide Monitoring laboratories. It is often difficult to find a laboratory sufficiently sophisticated to monitor these chemicals. (4) Little monitoring of State program effectiveness due to insufficient resources. (5) Lack of coordination among agencies involved with a given chemical event. Because EPA has primary authority in such matters, usually it should take the lead, but guidance is lacking. Headquarters should develop guidance on interagency coordination. (6) Public and community reaction that demands a certain action by the agency, even if it is scientifically unjustified. (7) Public and media opposition to a tracer study of 2,4-D transport. Use of tritium labeled 2,4-D has aroused fears of radioactivity.

Proposed Strategy

Regional Actions: (1) Increase monitoring and evaluation of State programs to establish benchmarks for future planning. (2) Continue the Federal inspection and enforcement program, visiting at least 120 sites to identify violations. Take enforcement actions where necessary. Give greater emphasis to Federal facilities. (3) Continue to reduce the market availability of problem pesticides or those that are inadequately labeled for particular uses. (4) Issue necessary permits for disposal of PCBs.

Headquarters Actions: (1) Better testing and anticipation of the environmental behavior of pesticides. This information should be included in use labels reflecting differing conditions of use. Herbicides (especially the various volatile formulations of phenoxies), and persistent insecticides such as endrin, heptachlor, and so forth are the chief categories requiring special attention. (2) Increased emphasis on interagency, interdisciplinary contacts to enhance program effectiveness at little additional cost. Such agencies as the U.S. Customs Service and the U.S. Department of Agriculture's Animal and Plant Inspection Service should be involved. These agencies also deal with toxic substances, but their personnel need additional training and resources. Cross-training between agencies in hazardous chemical problems should be continued and intensified, as a partial solution to the problem of inadequate resources. (3) Better and more thorough monitoring programs for pesticide residues and other contaminants, through increased funding of laboratories. (4) Better screening of Special Local Needs and Emergency

Exemptions for bioaccumulation potential, wildlife impacts, etc. (5) Background levels for various residues should be established as guidance for Agency policy, by establishing benchmarks for assessing environmental progress. This would entail obtaining and analyzing data from the Food and Drug Administration, Department of Agriculture, Fish and Wildlife Service, and the States and Regional Offices.

Expected Results
Region 10 believes these actions would improve the effectiveness of State programs, as measured by a decline in the number of misuse reports, complaints and investigations.

Over the long term, Region 10 expects a decline in levels of persistent pesticides and other toxic chemicals in wildlife, plants, and the food chain.

Air Pollution: Carbon Monoxide and Ozone

Problem Characterization
National clean-air standards for carbon monoxide and ozone are exceeded in the Northwest; however, carbon monoxide is by far the more significant. As measured by both magnitude and frequency, carbon monoxide problems in Region 10 are among the worst in the United States. (Sources: "National Compilation of Air Quality Statistics by SMSA, 1980-82;" also "Air Quality Data-1981 Annual Statistics Including Summaries with Reference to Standards;" EPA-450/4-82-007.)

Carbon monoxide problems are almost entirely due to motor vehicle emissions and poor meteorological mixing. Emissions have been significantly reduced by the Federal motor vehicle control program and local transportation control strategies. Ambient ozone standards are exceeded infrequently, and then only in the most populated airsheds.

Carbon monoxide (CO) and ozone (O_3) problem areas were identified on the basis of nonattainment designations. Region 10 has eleven areas where the carbon monoxide standard is not met and four areas where the ozone standard is not met. Three carbon-monoxide areas (Yakima, Washington, and Salem and Eugene-Springfield, Oregon,) and two ozone areas (Salem and Medford, Oregon) may be reclassified to attainment on the basis of recent data.

Table 5 characterizes the extent of the ambient air quality problem for each of the remaining nine carbon monoxide areas and two ozone problem areas.

Table 5
Partial[1] List of Region 10 Carbon Monoxide and Ozone Nonattainment Areas: Air Quality Summary

		CO (mg/m^3) Standard—10 for eight-hour average				O_3 (ppm) Standard—0.12 for one-hour average			
		Second High		Number Over Standard		Second High		Number Over Standard	
	SMSA Population	1980	1981	1980	1981	1980	1981	1980	1981
Carbon Monoxide									
Washington									
Seattle	1,400,000	13.7	15.7	15	22				
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Spokane	267,000	14.0**	12.8	11**	11				
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Oregon									
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Medford	133,000	18.1	16.6	83	48				
Idaho									
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Alaska									
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Fairbanks	23,000	18.4	17.1	42	30				
Ozone									
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Portland, Or./Vancouver Wa.	1,243,000					*	0.14	0	5

Reported air quality data was obtained from SAROAD unless otherwise noted.

1 Does not include those areas originally designated nonattainment, but which may be eligible for attainment status based on 1982 data.

* No exceedances of the standard in calendar year 1980.

** Value from valid monitoring site, but data not in SAROAD.

Sources

Carbon Monoxide:

Ambient carbon monoxide concentrations in most Region 10 areas are due almost entirely to mobile sources. They account for 90 to 95 percent of the emission inventories for all of the Region's nonattainment areas, except Medford and Boise. In these two areas, local agencies attribute 15 to 20 percent of the carbon monoxide emissions to wood-stoves and other space heating sources.

Ozone:

Stationary-source emissions play a much greater role in ambient ozone levels. In the Seattle-Tacoma and Portland-Vancouver ozone nonattainment areas, 1980 emissions data (base-year emissions from control strategies) show the stationary source contribution of hydrocarbons (precursors of ozone) is 56 and 52 percent, respectively. As motor vehicle controls are implemented, hydrocarbon emissions from vehicles are expected to decline at a faster rate than emission from stationary sources. Thus, emissions at the proposed date of attainment show a greater relative contribution to the ozone problem from stationary sources than in 1980. The stationary-source contribution in Seattle-Tacoma and Portland-Vancouver in 1987 is expected to increase to 61 percent and 60 percent respectively.

Program Implications

Done to Date: EPA approved attainment-date extensions beyond 1982 for six of the nine carbon monoxide nonattainment areas and for both of the ozone nonattainment areas. Attainment plans were required for each of these eight areas by July 1, 1982 and all have been submitted. The status of these plans, their characteristics, and current problems are shown in **Table 6**. As can be seen, Region 10 expects to complete approval of 1982 carbon monoxide and ozone SIPs by mid-1983 with "future needs" limited primarily to inspection and maintenance (I/M) activities.

Table 6
Carbon Monoxide and Ozone Nonattainment Areas with Post-1982 Attainment Dates: Control Strategies

	1982 Attainment Plans		Percent Emission Reduction Required	Strategy		Attainment Date	Future Needs
	Submitted	Status of Approval		I/M*	Other TCM's**		
Carbon Monoxide							
Seattle	Yes	Approved	36%	✓	✓	1986	Continue I/M, pursue antitampering
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Medford	Yes	7/15/83 Projected Approval	53%	✓	✓	1987	Follow I/M schedule
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Anchorage	Yes	9/15/83 Projected Approval	47%	✓	✓	1987	Complete METFAC study—follow I/M schedule
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Ozone							
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Portland, Or. Vancouver, Wa.	Yes	Approved	26%	✓	✓	1987	Same as Seattle—Tacoma

*Motor vehicle inspection and maintenance programs.

**Transportation control measures.

***Status of the Boise carbon monoxide plan is uncertain and subject to change

Three of the nine carbon monoxide nonattainment areas were required to meet national standards by the end of 1982. These areas continue to exceed standards. Approvable strategies for bringing these areas into attainment need to be developed (See discussion in **Barriers** section).

Barriers:

Barriers focus on either Clean Air Act requirements or national EPA policy.

Spokane and Tacoma, Washington, are cities without extensions that are now projected to be nonattainment past December 31, 1982. Without official extensions, these cities are prime targets for sanctions. Approvable plans to attain the standards need to be developed. However, existing Clean Air Act constraints may frustrate this objective. The Act currently requires that plans demonstrate attainment by the end of 1982 in order to be approvable. This is now an impossible requirement. Relief is anticipated through Clean Air Act revisions which will, in part, extend the statutory attainment date.

Other barriers are associated with national policies. Among these are: (1) Congress and EPA granted automobile manufacturers delays in meeting auto emissions standards. Current carbon monoxide control technology is less effective in cold-climate cities, which also have high ambient carbon monoxide levels. Anchorage and Fairbanks are examples. This problem would be exacerbated by further waivers or relaxation of the carbon monoxide emission standard. (2) Headquarters EPA has had difficulty in expeditiously processing State implementation plan (SIP) revisions due to their complexity and the necessity to maintain national consistency.

Proposed Strategy

Regional Actions: (1) Region 10 will complete ongoing approval actions for attainment plans. (2)Region 10 also will continue to work with Medford, Boise, Anchorage and Fairbanks to meet I/M schedules. (3) The Regional Office will apply sanctions as necessary to Boise, Spokane and Tacoma. To the extent practical, EPA will work with these areas to develop approvable SIPs to control carbon monoxide. (4) Compliance assurance activities will be initiated with States to control volatile organic compounds from stationary sources. Monitoring and enforcement action, when needed, are critical parts of Region 10 and State programs and must continue to receive high priority in order to achieve environmental objectives. (5) States will be encouraged to establish programs to reduce motor vehicle tampering and fuel-switching. (6) EPA will continue to provide technical assistance to States working on wood-stove-emission control programs.

Headquarters/Congressional Actions Needed: (1) Headquarters must expedite SIP processing. (2) The Clean Air Act needs to be revised to incorporate an equitable time frame to deal with cities (without attainment date extensions) that did not attain the carbon-monoxide standards.

Expected Results

Region 10 expects to approve plans (and see successful implementation) in all cities with attainment-date extensions. All these plans show attainment between 1985 and December 31, 1987. I/M programs are in place or anticipated in Portland, Seattle, Medford, Anchorage and Fairbanks.

SIP deficiencies for Boise, Spokane and Tacoma will be corrected when the law allows.

Region 10 anticipates continued air quality improvement to allow the following redesignations from nonattainment to attainment in calendar 1983:

For carbon monoxide—Salem and Eugene-Springfield, Oregon
For ozone—Salem and Medford, Oregon

The remaining two ozone nonattainment areas are predicted to attain standards between 1984 and 1987. Reasonable further progress toward the national standards will be tracked via annual reports on emission reductions and two principal environmental indicators: (1) the number of violation days, and (2) the severity of violations.

Air Pollution: Particulate Matter

Problem Characterization
The most significant problem areas were identified on the basis of not attaining health standards. Eight areas are designated "nonattainment" for total suspended particulate (TSP) primary standards. Table 7 characterizes the extent of the ambient air quality problem for each area.

Table 7
Particulate Non-Attainment Areas

TSP (ug/m^3)

		Primary Standard—75 for Annual Geometric Mean		Primary 24-hour Standard—260		
		Annual Geometric Mean		Days Over Primary 24-hour Standard		
	SMSA Population	1980	1981	1980	1981	1982**
Seattle	1,400,000	84	87	1	6	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Tacoma	402,000	101	94	4	1	0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Medford	133,000	83	76	3	0	0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Soda Springs	4,000	127	111	8	4	0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Reported air quality data was obtained from SAROAD.

*Data biased by ash from Mt. St. Helens eruptions.

**First two quarters only

Particulate air pollution problems in the Northwest arise from a diverse mix of emission sources. Contributors to high concentrations of total suspended particulates vary from area to area, but generally include both industrial facilities and sources of "fugitive dust," such as unpaved roads, parking lots and construction activities. Emissions from wood burning devices for residential space heating are a relatively recent and growing addition to the mix of significant sources, and already are a dominant factor in some areas. Most industrial emissions now are meeting control requirements, but much needs to be done to control area-source emissions, which include both sources of fugitive dust and space heating.

Sources
Table 8 provides an emission inventory overview for each of the eight areas where the particulate standard has not been met. Total emissions in tons per year is shown as well as the percent contributed by point and area sources. Where an area is dominated by a single point source or the control strategy relies primarily on control of a single source, annual emissions for that source are shown in the column entitled "Single Source."

Table 8
Particulate Emissions

	Base Year (1977-1979)				Base Year (1982 Projected)			
	Tons Per Year	Percent Area	Percent Source	Single Source	Tons Per Year	Percent Area	Percent Source	Single Source
Seattle	8,020	81%	19%		4,545	73%	27%	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	
Tacoma	8,290	48%	52%		5,771	36%	64%	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Medford***	9,175	64%	36%					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Soda Springs	6,880	33%	67%	2,500	4,351	44%	56%	550
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Unless otherwise noted, emissions information is taken from the attainment plans developed pursuant to Part D of the Clean Air Act. Both "base year" (1977-1979) data is shown as well as "projected" emissions for 1982.

*Data based on 1982 report on reasonable further progress.

**Control program recently completed. Emission reductions have not been calculated, only estimated.

***Data from draft SIP; projected emissions are for 1984.

Program Implications
Done to Date: After designating the above areas nonattainment for the primary standards for particulates, the States of Washington and Idaho adopted—and EPA approved—strategies to bring the areas into attainment by the statutory deadline of December 31, 1982. The plan for Medford, Oregon, submitted in late April 1983, includes steps to reduce emissions from wood stoves used for home heating, a serious and growing problem there and in other areas of the Northwest.

Generally, each control strategy reflects already-adopted controls on traditional sources and focuses on either fugitive dust (area source) or additional single point-source controls. Plans that rely primarily on control of road and parking-lot dust are those for Seattle, Tacoma, and Spokane. Plans for Lewiston, Pocatello, and Soda Springs, Idaho, and for Vancouver, Washington, each focus on controlling a single large stationary source. Half of the emission reductions called for in the Medford primary standard plan would come from wood stoves.

Barriers: (1) EPA has worked for years to develop an inhalable particulate (IP) standard to modify the existing standard for total suspended particulates. The new standard is to focus on small airborne particulates that can be inhaled deep into the lungs. The present standard encourages control of particles that may be too big to reach the lungs. State and local officials have anticipated this new standard for some time. As a result, they and EPA have been hesitant to commit large sums of money to new control measures. EPA hopes to propose an inhalable-particulate standard in 1983. It appears almost certain that a modified standard, rather than the status of current nonattainment areas, will drive management and budget decisions in 1984 and beyond. (2) From July 1981 to July 1982, EPA operated a minimal clean-air program in Idaho in the absence of a State-run program. Since August 1982, Idaho has been gradually staffing its new air program. As a result, current emissions and recent particulate-emission reductions in Idaho's TSP nonattainment areas are still being evaluated. (3) Increased use of wood stoves for residential space heating has resulted in a new area-source problem in several nonattainment areas. The contribution of wood-stove emissions to ambient particulate levels is not known for all nonattainment areas. Further, enforceable measures to control these emissions are not readily available.

Proposed Strategy

Regional Actions: (1) Barring any relevant change in the Clean Air Act, Region 10 will continue to focus on the Administrator's program to deal with all primary-standard nonattainment areas that did not attain standards by the end of 1982, obtaining improved and current emissions inventory data, and developing data on reasonable further progress. (2) Once the Agency proposes a health-related standard for inhalable particulates, Region 10 plans to proceed as quickly as possible with such activities as preliminary identification of nonattainment areas, design of an ambient monitoring network, and development of control strategies. (3) Region 10 also expects to develop an improved data base for wood-stove emissions, and devise needed control strategies. Recent evidence indicates that the increased use of wood stoves for residential space heating may be causing significant air quality problems. In Oregon, a significant wood-stove contribution to ambient particulate concentrations in several locales is documented. At least one local strategy has been developed to reduce these emissions. The State of Alaska also has adopted measures to reduce wood-stove emissions. However, more information is needed to quantify the problem and, if necessary, promote the development of additional State/local control measures. More research may be needed. (4) State implementation plans work only if sources comply with regulatory emissions limits. Compliance monitoring and enforcement action to assure compliance, where needed, are a critical part of EPA Region 10 and State programs. These activities will continue to receive high priority in order to achieve our environmental objectives.

Headquarters Actions Needed: (1) Provide policy and guidance on particulate control strategies and sanctions. If Congress fails to amend the Clean Air Act what will the sanction policy be? Regardless of the legislative outcome, what will be required with respect to control strategies for total suspended particulates while the inhalable-particulate standard is being finalized? Will we continue to require some kind of "reasonable further progress" for total suspended particulates? Will non-traditional fugitive-dust control efforts be required where needed for attainment? (2) Publish an inhalable-particulate standard.

Expected Results

With the anticipated adoption of an inhalable-particulate standard, Region 10 expects that the number of primary-standard nonattainment areas will be reduced. Nonattainment areas most likely to become attainment under a new inhalable-particulate standard are those with marginal violations of the present standards due mostly to fugitive dust emissions. Further, Region 10 expects to achieve attainment within allowable time frames in those areas found to be nonattainment for inhalable particulates. Reasonable further progress toward the standards will be tracked via annual reports on emission reductions and the two principal environmental indicators for air pollution: (1) the number of violation days, and (2) the severity of violations (both short term and annual standards).

Region 10 projects the following accomplishments through FY 1984.

FY 1983:

1. Continue with the Administrator's program for dealing with those nonattainment areas that fail to attain primary standards for total suspended particulates by the December 31, 1982 statutory attainment date.
2. Process the State implementation plan to control particulates in Medford, Oregon.
3. Following EPA proposal of a standard for inhalable particulates:
    - Complete an initial determination of areas likely to be nonattainment for inhalable particulates.
    - Update emissions inventories for nonattainment areas.
    - Start redesigning ambient monitoring networks to measure inhalable particulates.
    - Begin development of control strategies, including the preliminary evaluation of the impact of wood-stove emissions on probable nonattainment areas.

4. Attain primary standards for total suspended particulates in Lewiston-Clarkston, and Vancouver.

FY 1984:

Following promulgation of the inhalable-particulate standard:

1. Publish a list of nonattainment areas.
2. Complete substantial work on draft plans to reach attainment.

Microbiological Contamination of Estuarine and Shellfish Areas

Problem Characterization
Region 10 has some of the most productive commercial shellfish rearing and harvesting areas in the country. In 1981, the Oregon and Washington State fisheries departments reported an annual gross production of 61.1 million pounds of shellfish valued at $39.1 million dollars. Alaska produced 129 million pounds of shellfish in the first 10 months of 1982 with an associated value of $249.3 million. (Much of the Alaskan output is not presently threatened by microbiological contamination.) Shellfish beds in Oregon and Washington are in estuarine waters subject to bacterial contamination from point and nonpoint sources. Shellfish such as oysters, clams and mussels can concentrate disease-causing bacteria and viruses as well as certain toxic chemicals, radionucleides and biotoxins. (Paralytic shellfish poisoning, or PSP, results from a naturally occurring toxin produced by a group of one-celled marine algae.) Over the past few years these areas—both commercial and recreational—have been closed many times due to microbiological contamination that might cause illness in humans. There also have been reported cases of human illness due to the consumption of shellfish.

Sources
Pollution problems generally are caused by inadequately treated or by-passed sewage and nonpoint sources, such as agricultural (animal) practices, on-site waste disposal and stormwater runoff.

Shellfish-area closures are used as a surrogate measure of status and predictors of further problems in these marine areas.

Table 9 briefly describes major areas of concern.

Table 9
Contaminated Estuarine Shellfish Areas in Region 10

Problem Area	Population, Area, and Beneficial Uses Affected	Contaminants Present	Sources
South Pugat Sound Washington	Area: 11,700 acres approved for harvesting. 30% of the commercial shellfish-growing area (3,400 acres) is closed to harvesting. 1,700 acres conditionally approved.	Bacteria, fecal coliform	*Municipal:* Ten *Industrial:* 28 *Nonpoint:* Onsite waste disposal, agricultural (i.e., animal) practices, and stormwater runoff.
[illegible]	[illegible] commercial harvesting. Oyster Bay: 35,000 acres which harvesting is conditionally approved. North and South Bays: [illegible]	[illegible] temperature during low-tide periods, some toxics in water and sediments.	[illegible] *Nonpoint:* Agricultural runoff.
Tillamook Bay Oregon	2,065 acres, 540,000 clams/year. 24,700 pounds shucked meat/year.	Coliform bacteria. 31% of samples exceed total-coliform standards and 16% exceed fecal coliform standards. Some pesticides.	*Municipal:* Five (5%) *Industrial:* Ten (5%) *Nonpoint:* Dairy Farming, other agriculture (75%). Septic tanks (15%). *(Percentages show relative magnitude.)*
[illegible]	[illegible] to commercial harvesting.	[illegible] oxygen. 26% of the samples exceed bacteria standards. 12% of the samples [illegible]	[illegible] *Industrial:* 21 *Nonpoint:* [illegible] problems, [illegible]

Program Implications
Done to Date: Both Washington and Oregon State environmental agencies have taken a strong lead role in determining sources of shellfish-bed problems and planning to correct and prevent bacterial pollution in estuarine areas. In both states, the main focus has been on protecting commercial shellfish harvesting.

The States have relied on five programs: (1) Upgrading sewage treatment plants with Federal and/or State grant programs. (2) National Pollutant Discharge Elimination System permits and enforcement. (3) Water quality management funding to identify problems and develop control plans, particularly best management practices for nonpoint sources. (4) Environmental assessments through the Clean Water Act Section 404 dredge-and-fill permit program. (5) Coastal Zone Management and Shoreline Management programs.

The State of Washington developed an initial concept paper on protecting shellfish areas in Puget Sound. This initial plan is being built into the Puget Sound Study as one of its three major elements and is being coordinated by the Department of Ecology with the State Department of Social and Health Services, county health departments, and local coastal zone management agencies. The State also has programmed some of its Clean Water Act Section 205(j) water quality management funds in two important shellfish areas.

In addition, the State has worked closely with local and Federal agencies to develop a Grays Harbor Management Plan for that Pacific Coast area, where extensive environmental assessments have been carried out under the Section 404 dredge-and-fill permit program. The State also worked closely with industries in the area to institute industrial pH controls and to provide State and Federal dollars to build municipal sewage plants. The Department of Social and Health Services runs a shellfish monitoring program.

In Oregon, the State directed Federal funds to local agencies in Tillamook and Coos bays to improve options for sewage treatment plants and management practices for identified nonpoint sources.

Barriers: (1) Inability to precisely determine the causes of problems and/or the relative severity or loading of point and nonpoint sources. (2) Inadequate State, local and Federal resources to monitor, develop or implement control programs, or encourage the voluntary use of best management practices. (3) Competition with other needs for available monitoring resources to conduct follow-up "cause-and-effect" and "before-and-after" studies. (4) Lack of information on the critical growth factors of the algae that cause paralytic shellfish poisoning (PSP).

Proposed Strategy

Regional Actions: The States will continue to rely on permit and enforcement programs, where applicable, to control point-source discharges in these areas. State and Federal construction grant monies, as available, will be directed to the municipalities affected.

Oregon and Washington are developing water quality management plans for high priority problem areas and will attempt to meld point and nonpoint source controls to remedy the problem. They are working with the Federal Food and Drug Administration (FDA) to ensure that their activities will meet FDA health-related requirements.

The State of Washington is developing a plan for shellfish protection for all of Puget Sound. This plan will direct monitoring, planning and permitting activities in the larger Puget Sound Study. This is being done in conjunction with coastal zone management programs. Resource constraints may play a large part in the implementation of this plan. EPA will participate with the State through the Puget Sound Study to develop and implement a comprehensive shellfish protection strategy. EPA will facilitate program and technology transfer between Washington and Oregon. EPA also will provide monitoring and technical assistance to the Oregon Department of Environmental Quality through State/EPA Agreement negotiations bearing on the Tillamook and Coos Bay areas.

A summary of actions underway and planned for improving water quality in the economically important shellfish-raising and harvesting areas is presented in Table 10.

Table 10
Contaminated Estuarine Shellfish Areas: Existing Actions and Control Strategies.

Problem Area	Existing Actions	Control Strategy
South Puget Sound Washington	State concept paper on shellfish protection will help guide the Puget Sound Study. It calls for monitoring, for best management practices development, and point-source controls.	Shellfish-area definition, intensive monitoring, water quality management plan to be developed for Burley Lagoon and Minter Bay, Washington, using the Clean Water Act Section 205(j) planning funds.
[redacted]	[redacted]	[redacted]
Tillamook Bay Oregon	Best management practices identified in Clean Water Act. Implementation funded by U.S. Department of Agriculture. Memorandum of understanding and alarm system with sewage treatment plants. National shellfish sanitation program.	Monitor to verify water quality and shellfish harvest improvements.
[redacted]	[redacted]	[redacted]

Headquarters Actions Needed: (1) Support flexibility in using available funds, such as those allocated for Clean Water Act Section 205(j), to develop nonpoint-source controls and additional water quality monitoring. (2) Provide guidance on water quality criteria and standards for toxics and other conventional parameters in marine estuarine waters. (3) Support research into the growth requirements of the algae responsible for paralytic shellfish poisoning.

Expected Results

Region 10 will help implement the shellfish part of the Puget Sound Study. In 1984, the Coos Bay water quality management plan should be completed and further data reports on the Tillamook Bay implementation activities will be prepared. The Grays Harbor management plan will be finished. Results would be measured in the number of acres certified for shellfish harvesting (32,038 in 1981).

Fishery Damage from Contaminated Waters

Problem Characterization

Commercial and sport fishing are historically important economic activities in the Pacific Northwest and Alaska. Over the past 50 years, however, a combination of overfishing, pollution, and loss of habitat has severely depressed the Region's fish resources. Demand for sport fishing and fish products has remained strong, driving prices to the point where a food that once was a dietary staple now has become a luxury.

Public demand for enhancement of the fishery is growing. Hundreds of millions of dollars of public and private investment has been made in fishery research, fish hatcheries, and fish-passage ladders on large dams. Congressional concern over the Northwest fishery was reflected in the Northwest Power Act of 1980, which directed the Northwest Power Council to establish a program to protect and restore fish and wildlife resources damaged by the construction of hydroelectric dams.

For the public investment in the fish resource to be successful, clean water is a prerequisite. The early interest of the Northwest States in water quality enhancement was a timely reflection, in part, of the growing public concern for restoration of a vigorous, healthy fishery. Although many problems have been addressed, lowstream flows, high temperatures, obstructions, and residual chlorine still block the passage of fish in streams, and those that manage to reach spawning grounds often find spawning gravels covered by excessive siltation. Recent growth and impending development make it imperative to strengthen State programs to achieve the fishery-protection objectives of the Clean Water Act.

Toxicity, high levels of solids, and excessive nutrient loadings that degrade water for fish are associated with other major industries supporting the Northwest economy. Mining, seafood processing, oil and gas development, agriculture—both dryland and irrigated—and silviculture are the primary sources of heavy metals, solids and nutrients in many areas. The challenge is to develop operating procedures that allow economical operation of these industries while minimizing damage to existing fisheries or other designated beneficial uses.

Region 10 has large mineral deposits under exploration and development. Past mining practices and the sensitivity of mining to economic forces makes toxics contamination a continued threat. Several waterways and bodies of water within the region have suffered significant use impairment due to the discharge or leaching of heavy metals from active or abandoned mines. The potential for increased exploration and development of mineral resources throughout the Region argues for high priority for this problem.

In Alaska alone, there were 70,431 active mining claims in 1981. A year later there were calculated to be 80,000 claims, based on 8,409 new claims filed. Of 700 licenses issued in 1981, 60 percent were for placer mining and 40 percent were for hard-rock mining. Hardrock and coal mining projects have been estimated to be able to create 1000 to 6000 jobs and from $577 million to $3 billion in wages and purchases to the state. In 1981 gold mining yielded 134,400 troy ounces of gold and contributed $55 million to Alaska's economy, coal mining contributed $15.5 million and the hard-rock exploration industry contributed approximately $100 million. (Alaska Construction & Oil, September 1982.)

Examples of major projects under exploration and/or development are US Borax Quartz Hill molybdenum mine (Potential: 1.5 billion tons), Red Dog ore mine (85 million tons), Beluga coal field (20 million tons per year) and Usibelli coal mine (about 240 million tons of reserves).

While Idaho mine reserves may not be as extensive as those in Alaska, in 1981 the major mines produced more than 18 million ounces of silver, 2800 tons of copper and various quantities of zinc and lead from more than 1 million tons of ore. This production was developed at a time when the downsliding economy had severely affected the mining industry and one of the major producers in the Silver Valley in Idaho (Bunker Hill) was closed for the entire year. Also, the Yankee Fork Ranger District in the Challis National Forest in Idaho has more mining activity than any other unit of the Forest Service in the country.

Seafood processing also is a major economic activity. Waste disposal practices in this industry have the potential to reduce fish and shellfish resources in the Region, particularly in Alaska. Out of about 300 seafood processors in the Region, 225 are in Alaska. The plants are widely dispersed throughout the western and southern coastal reaches of the state. Hundreds of millions of pounds of fish and shellfish are processed each year. Several areas such as Kodiak, Dutch Harbor and Petersburg have significant concentrations of seafood processing facilities. In Dutch Harbor, the second-largest processing center in Alaska, 11 processors processed approximately 72 million pounds of shellfish in 1976. This figure has dropped in recent years due to lower harvests. Of the total harvest weight processed, about two-thirds is waste that is discharged to marine waters following grinding. Accumulation of these wastes smothers the benthos causing a major water quality problem.

Offshore oil and gas exploration and development represents another concern primarily from a solids-disposal standpoint. Most offshore oil and gas activities will occur in Alaska. The U.S. Geological Survey and Bureau of Land Management, in environmental impact statements and other reports estimate that 920 million acres offshore could be offered for lease in Alaska from 1982 to 1986. Presently, only 2 million acres have been leased. Undiscovered reserves in potential lease areas are roughly estimated at 12.3 billion barrels of oil and 64.4 trillion cubic feet of gas. Most current concerns center on discharges of muds, cuttings, and other related oil-rig discharges from exploration activities. The major problem associated with oil and gas exploration is deposition of solids on the ocean floor with potential smothering affects to the benthos. Development of these areas for production is expected to follow. Discussions are underway on the proposed Endicott development project, which could contain up to 240 wells and four gravel islands. Construction of the gravel islands and operation of the drilling rigs, if not properly conducted, may affect migrating fish.

Silvicultural and agricultural activities are significant, too. Region 10 has more than 65 million acres of commercial forest land. Erosion from improperly built or maintained logging roads is the major concern in logging operations. It has been estimated that up to 8000 miles of new logging road yearly and 3800 miles rebuilt per year, could be constructed depending on the economic situation in the Region. (USEPA, 1975 *Logging Roads and Protection of Water Quality*, Region 10). Log storage and transfer activities are of concern as they relate to the valuable ecosystems and vitality of wetland areas with which they are associated. Admiralty Island, in Alaska, is one area of major controversy at this time.

Agricultural cropland in Region 10 totals about 19.4 million acres. Excessive soil erosion on this cropland amounts to 2.2 million acres. Severe soil erosion is defined here as erosion at 5 tons per acre or greater. (USDA—SCS 1980 RCA Inventory) Irrigation return flow is also a major source of pollution in several major rivers in the Region. The Yakima and Palouse rivers in Washington, the Owyhee, Malheur and Klamath basins in Oregon and the Boise, Portneuf, Weiser and Payette rivers and Rock Creek in Idaho suffer significant nonpoint-source pollution. The Region

includes several other areas where water quality is of serious concern to EPA and the States, but these areas are not easily classifiable into a generic pollutant category. These areas are subjected to point and nonpoint sources of pollution including municipal, industrial, agriculture, urban runoff and others such as combined sewer overflows. Waters identified as high priority by both the States and EPA are the Spokane River, the Yakima River, the Boise River and the South Umpqua River.

The traditional approach to dealing with water pollution problems, i.e., focusing on point-source permitting and compliance, has been responsible for improvements so far achieved in cleaning the fishable waters of the Pacific Northwest and Alaska; however, because these waters are so extensively affected by nonpoint-source pollution a different strategy emphasis now is required by both EPA and the States.

The problems of each individual area are discussed in Table 11.

Table 11
Contaminated Fishery Waters in Region 10

Geographical Area or Water Pollution Issue	Beneficial Use Summary: Category	Beneficial Use Summary: Level of Use	Parameters of Concern	Contribution Summary: Estimated Relative Magnitude	Contribution Summary: Source Category	Contribution Summary: Comments
Alaska Placer Mining: Fairbanks, Alaska Livengood, Alaska Circle, Alaska Chicken, Alaska Talkeetna, Alaska McGrath, Alaska	Growth and propagation of aquatic life Domestic Water Supply Secondary contact recreation	High Medium	Turbidity, sedimentation Dissolved metals	50-95% 5-50%	Industrial Background	Mining operation Estimate that as many as 800 active placer mines discharge to about 500 streams. Scarcity of ambient water quality monitoring data prohibits anything other than a gross estimate of relative contributions.
[illegible]	[illegible] Secondary contact recreation	[illegible] use	[illegible]	[illegible] 80% 20%	[illegible] Nonpoint Natural	[illegible] Tailings/leachings Background surface runoff [illegible]
South Fork of the Coeur D'Alene River, Idaho	Cold water biota, salmonid spawning and primary contact recreation	Protected for the future from its mouth to Mullan, Idaho	Heavy metals	40% 50%	Industrial Industrial	Bunker Hill tailing and leakage and other inflows attributed to Bunker Hill and other mine discharges and leachates above Bunker Hill.
			Phosphorus	90% 5%	Industrial Industrial	Bunker Hill tailing pond leakage. Bunker Hill permitted discharge from treatment plant.
	Secondary contact recreation	Low	Fecal coliform	20% 70-90%	Municipal Nonpoint	Municipal sewage treatment plants. Septic systems
[illegible] Quartz Hill, Alaska Red Dog, Alaska Greens Creek, Alaska	Growth and propagation of aquatic life Domestic water supply	High Medium	Sedimentation, dissolved metals Process reagents in [illegible]			Environmental assessment and preliminary development activities underway. Production expected to commence within 3-8 years.
Surface Coal Mining: Beluga, Alaska Healy, Alaska	Growth and propagation of aquatic life Domestic water supply	High Medium	Sedimentation, acid drainage Leaching of potentially toxic materials			Environmental assessment and preliminary development activities underway. Production expected to commence within 5-10 years.
[illegible] Kodiak, Alaska Dutch Harbor, Alaska Akutan, Alaska Petersburg, Alaska Ketchikan, Alaska Cordova, Alaska Bristol Bay, Alaska	Growth and propagation of aquatic life Water supply, seafood processing	High High	Dissolved oxygen	[illegible] 5-10% 1-5%	Industrial Municipal Background	Seafood processing wastewater
Offshore Oil and Gas Exploration: Norton Sound, Alaska Beaufort Sea, Alaska Cook Inlet, Alaska Gulf of Alaska, Alaska Diapir Field, Alaska St. George Basin, Alaska Shelikof Strait, Alaska	Growth and propagation of aquatic life	High	Oil and grease, solids Fecal coliform, drilling muds, dissolved hydrocarbons, *oil field brines*			

Table 11 (continued)
Contaminated Fishery Waters in Region 10

Geographical Area or Water Pollution Issue	Beneficial Use Summary		Parameters of Concern	Contribution Summary		
	Category	Level of Use		Estimated Relative Magnitude	Source Category	Comments
[illegible]	Growth and propagation of aquatic life	High	Oil and grease, solids			
			Dissolved [illegible]			
Silviculture: West Coast of Oregon and Washington, Central Idaho, Southeast Alaska	Growth and propagation of aquatic life	High	Sediment, turbidity			In Idaho, Oregon, Washington: 65 million acres of commercial forest. 8,000 miles of new logging roads and 3,300 miles of rebuilt logging roads each year.
Spokane River, Washington	[illegible] spawning	High High	Phosphorus	70-80%	Municipal Nonpoint	Municipal sewage treatment plants, combined sewers—runoff (Spokane)
	Spawning and rearing of warm water gamefish	High High	Phosphorus Phosphorus	Under 20%	Nonpoint	Hangman Creek—agriculture
				Under 10%	Nonpoint	Septic systems
			Heavy metals	90%	Industrial Nonpoint	Idaho mining activities
	Recreation: Water contact, boating/fishing, aesthetics	High High	Low dissolved oxygen			Oxygen problem is caused by phosphorus and related algae problems (see above)
	Water Supply:	Low				
Yakima River, Washington Sunnyside Dam to its mouth	Salmonid migration	Low	Temperature		Nonpoint	Irrigation
	Salmonid rearing	Low			Natural	Natural low flow
	Spawning and rearing of warm water game fish		Nutrients	60%	Nonpoint	Irrigation
				40%	Municipal Industrial	
	Recreation: Boating/fishing, aesthetics	Medium Medium	Fecal coliform	70-90%	Nonpoint	Irrigation, animal wastes
				Under 20%	Municipal	Municipal sewage treatment plants
	Water Supply: Industrial, Agricultural	Low High	Solids, turbidity	80-90%	Nonpoint	Irrigation
[illegible] Boise, Idaho	[illegible]	High	Nutrients	80-90%	Nonpoint	Irrigation
				Under 20%	Municipal	Municipal—Boise treatment plant
				Under 10%	Nonpoint	Urban runoff
	Cold water biota	Medium/High (Reserved for Future Use [illegible])	Fecal coliform	70-80%	Nonpoint	Agricultural runoff, animal wastes
				Under 20%	Municipal	Municipal
				Under 20%	Nonpoint	Urban runoff
	Salmonid spawning	Low (Reserved for Future Use)	Chlorine	100%	Municipal	Municipal sewage treatment plants
	Primary and secondary contact recreation	High High	Temperature		Nonpoint	Agriculture (irrigation)
					Nonpoint	Hydromodifications
			Solids	80-90%	Nonpoint	Agriculture (irrigation)
				Under 20%	Nonpoint	Urban runoff
			Pesticides in fish		Nonpoint	Agriculture—need current data

Table 11 (continued)
Contaminated Fishery Waters in Region 10

	Beneficial Use Summary			Contribution Summary		
Geographical Area or Water Pollution Issue	Category	Level of Use	Parameters of Concern	Estimated Relative Magnitude	Source Category	Comments
Lower Malheur River, Oregon *These uses are found in the Snake River segment of the Malheur Basin (which is the receiving water of the Malheur River).*	Agriculture	High	Suspended solids	65-75%	Nonpoint	Return flow resulting from intensive irrigation (River Mile 0-21)
	Livestock watering	High		10-20%	Nonpoint	Mixed agriculture/livestock (River Mile 21-49)
	Warm water fishery	Medium		10-20%	Background	Upstream input (River Mile 49)
	Agriculture	High	Total phosphorus	65-75%	Nonpoint	Irrigation return flow (River Mile 0-21)
	Livestock watering	High		10-20%	Nonpoint	Mixed agriculture/livestock (River Mile 21-49)
	Cold water fishery	High		10-20%	Background	Upstream input (River Mile 49)
	Warm water fishery	High				
			Total nitrogen	75-85%	Nonpoint	Irrigation return flow (River Mile 0-21)
	Contact recreation	Medium		10-20%	Nonpoint	Mixed agriculture/livestock (River Mile 21-49)
	Aesthetics	Medium		5-10%	Background	Upstream input (River Mile 49)
			Coliform bacteria	70-80%	Nonpoint	Mixed agriculture/livestock (River Mile 0-49)
				20-30%	Background	Upstream input (River Mile 49)
Klamath River, Oregon	[illegible]	High	Total phosphorus	60-75%	Background	Input from Klamath Lake
	Warm water fishery	High		25-40%	Nonpoint	Agricultural runoff
	Cold water fishery	High		1-5%	Municipal	
	Aesthetics	High	Total nitrogen	60-70%	Background	Input from Klamath Lake
	Livestock watering	Medium		25-45%	Nonpoint	Agricultural runoff
	Contact recreation	Medium		1-5%	Municipal	Due to combination of nitrification, algal demand, and low stream velocities resulting from impoundments. (Segment of concern is upstream of John C. Boyle Dam.) Dissolved oxygen generally returns to higher levels [illegible]
			Low dissolved oxygen			
Tualatin River, Oregon **River Mile 0-39**	Cold water fishery	High	Total nitrogen	60-80%	Municipal	
	Warm water fishery	High		10-20%	Nonpoint	Agricultural runoff
	Anadromous fishery	High		5-10%	Nonpoint	Miscellaneous runoff from residential land use
	Agricultural	High		5-10%	Background	
	Contact recreation Livestock watering	Medium Medium	Low dissolved oxygen			Due to combination of nitrification, sediment oxygen demand, low hydraulic gradient, and low summer streamflows.

Table 11 (continued)
Contaminated Fishery Waters in Region 10

	Beneficial Use Summary			Contribution Summary		
Geographical Area or Water Pollution Issue	Category	Level of Use	Parameters of Concern	Estimated Relative Magnitude	Source Category	Comments
South Umpqua River	Contact recreation	High	Coliform bacteria	40-60%	Municipal	Overflows and sewage treatment plant deficiencies
	Aesthetics	High		25-35%	Nonpoint	Animal wastes and agricultural runoff
	Warm water fishery	High		10-20%	Nonpoint	Log storage ponds and runoff
	Agricultural	High		10-20%	Background	
	Livestock watering	High				
	Cold water fishery	Medium	Total phosphorus (June-October)	50-70% 15-35%	Municipal Nonpoint	Agricultural runoff
	Anadromous fishery	Medium		10-15%	Background	
			Total nitrogen (June-October)	30-50% 30-50% 20-30%	Municipal Nonpoint Background	Agricultural runoff
			Biochemical oxygen demand	30-50% 30-50%	Municipal Nonpoint	Agricultural runoff
			(June-October)	20-30%	Background	
			Low dissolved oxygen			Due to a combination of carbonaceous oxygen demand, nitrification, algal demand (including periphyton), and low summer stream flows (sometimes below 100 cfs.).

Program Implications

Done to Date: Actions to reduce or prevent contamination by toxic substances, particularly heavy metals, and to control the release of solids and nutrients generally involve correction of past practices and building proper design and safeguards into proposed activities.

Control actions have been designed for individual cases and have centered on traditional programs: (1) Point source control through National Pollutant Discharge Elimination System permits, compliance inspections and enforcement—EPA and State environmental agencies use permit procedures to identify problems and improper past practices. National Pollutant Discharge Elimination System permits limit heavy metals and solids discharges. (2) Point-source control of nutrients through construction and upgrading of sewage treatment plants where necessary, and compliance inspections and enforcement. (3) Nonpoint-source controls through funding of water quality management plans under Section 208 of the Clean Water Act. Agricultural and silvicultural water quality management plans have been developed for each State in Region 10. Forest practices acts and rules and regulations have been adopted by each State. (4) Monitoring and intensive surveys to define the problem and verify that controls are working. (5) Participating in the scoping process to develop liason prior to the development of environmental impact statements and preparing new-source environmental impact statements. For new developments, the Region primarily relies on work on environmental impact statements and new source permits to ensure that appropriate safeguards are designed into the proposals from the start. We are encouraging better environmental assessments and environmental impact statement for new sources, as appropriate. (6) Evaluating and commenting to the Corps of Engineers on Clean Water Act Section 404 dredge-and-fill permit activities.

Barriers: (1) Ownership and liability is difficult to assess, particularly for abandoned/closed mines. (2) Long processing times at Headquarters for approval of the general permits for placer mining, oil and gas development and seafood processors. Issuance of general permits will bring many more sources under regulatory control. Many sources now have either outdated permits or lack permits entirely because of administrative delays that would be eliminated under the general permits. (3) Amount of time and data necessary for a 403(c) determination is extensive and precludes fast tracking projects. (4) Inability of States and EPA to provide sufficient resources for nonpoint-source control programs. State resources are barely adequate to maintain existing point-source control programs. (5) Best management practices, even when generally agreed upon, are difficult to enforce as standards to reduce pollution. Economic pressures push farmers, foresters, miners, and others away from adherence to such standards because they are viewed as unproductive, add-on costs. (6) Water quality management funding under Section 205(j) of the Clean Water Act may not be sufficient to adequately deal with all of the problems and allow development of effective best management practices for all areas. (7) Federal and State funds to implement nonpoint-source controls, such as the U.S. Department of Agriculture's Rural Clean Water Program funds to help farmers carry out best management practices, are inadequate.

Proposed Strategy

Regional Actions: The diversity of fishery problems requires that individual control strategies be developed for each particular area. The Region's basic strategy, however, can be generalized as follows: (1) Use the State/EPA Agreements to identify high priority water bodies critical to fisheries enhancement. Clean Water Act water quality management funding under

Section 205(j) could be allocated for work in these areas. (2) Bring non-permitted existing sources that affect these waters under permit as soon as possible and monitor compliance. General permits would be used when appropriate to expedite administrative processing. (3) Assure compliance with existing permits. Use the State/EPA Agreement to negotiate a more efficient distribution of the compliance workload. (4) Use the environmental-impact-statement process to minimize and require mitigation of the effects of new sources. (5) Ensure that best management practices are required in land-use contracts covering Federal and State lands. (6) Establish a public information program to show the long-term benefit to landowners and users to be achieved through improved management practices that also enhance water quality. An example of such a benefit would be the fact that placer-mine settling ponds catch significant amounts of fine gold that can be recovered. (7) Periodic reviews with States focusing on progress in priority water bodies.

General permits are being developed as appropriate for placer mining, seafood processing and oil and gas exploration. Region 10 also will comment on proposed effluent guidelines affecting these activities. The Region is negotiating a municipal compliance strategy in each State through the Fiscal 1984 State/EPA Agreement. Region 10 also is coordinating with Headquarters to develop a national nonpoint-source strategy that will incorporate identified needs for nonpoint source controls. And as resources allow, Region 10 will conduct water quality monitoring and intensive surveys to better identify problems and develop wasteload allocations on high priority waters.

A summary presentation of past actions and proposed strategies for each priority area is in Table 12.

Table 12
Contaminated Fishery Waters in Region 10: Existing Actions and Control Strategies

Problem Area	Existing Actions	Control Strategy
Alaska Placer Mining: Northern Region South Central Region Southeast Region	770 miners operate under compliance orders issued under Clean Water Act Section 309. Monitoring and inspections have been conducted. Regional Office is preparing general permits and conducting enforcement activities	Issue individual permits. Resume monitoring and inspection in 1983. Develop and issue some individual permits based on best professional judgments. Issue permits requiring best available treatment by placer miners in 1984.
[illegible]	[illegible] wastewater treatment plant to [illegible] mine. Diversions of drainage from the mine and tailings piles. Environmental Impact Statement coordination and [illegible]	[illegible] Potential superfund site. [illegible]/closure plan developing with company.
South Fork of the Coeur D'Alene River, Idaho	State and EPA have identified this in the State-EPA Agreement as a high-priority water quality problem. EPA intensive survey. Silver valley coordination plan, tailings pond leakage-control plan. Permits, enforcement. Mine closed from strikes and economy. Bunker Hill mine is Superfund site (Number/Group 1).	Act on proposed Superfund designation. Implement mine-spoils reclamation plan (subject to availability of funds); remedial action or correction under Superfund. Combined stormwater overflow correction.
[illegible]: Quartz Hill, Alaska Red Dog, Alaska [illegible]	[illegible] coordination.	[illegible] discharge permits.
Seafood Processing: Kodiak, Alaska Anchorage, Alaska Petersburg, Alaska Cordova, Alaska Remote Areas	Permits issued to some but not others. Draft general permit being prepared. Environmental assessment at Trident in Aleutians. Dive reports from field surveys. Enforcement action based on inspections; Six compliance orders under Clean Water Act Section 309, one referral to Headquarters.	Issue general permit for 158 processors. Issue individual permits in Kodiak (1), Cordova (3). Reissue Dutch Harbor permits. Issue permit based on water quality to Trident in the Aleutians. Environmental assessment for new sources in Aleutians. Issue permits for 15 seafood processors in Aleutians in March 1984. Continue enforcement in Fiscal '83.
Offshore Oil and Gas Exploration: Norton Sound, Alaska Beaufort Sea, Alaska Diapir Field, Alaska St. Georges basins, Alaska Gulf of Alaska, Alaska Shelikof [illegible], Alaska Lower Cook Inlet, Alaska [illegible]	[illegible] two determinations under Clean Water Act Section 403 (c).	Develop and issue general permits for exploration in [illegible] lease [illegible]. Review industry data and establish monitoring process and use this data in the development of oil- and gas-production permits.
Onshore Oil Production and Exploration: Kenai, Alaska Valdez, Alaska Endicot, Alaska Prudhoe Bay, Alaska	NPDES permit and 404 permit issued. EIS's were prepared on each site.	EIS beginning on new water flood projects. Requiring special monitoring of industries through permitting processes.
[illegible] West Coast of Oregon and Washington, [illegible] Southeast Alaska	[illegible] and requiring best [illegible] practices [illegible] as a result of work under Clean Water Act [illegible]	[illegible] monitoring to determine effect of best management practices.
Spokane River, Washington	Analysis of county's wastewater management plan, with Environmental Impact Statement. Total maximum daily load prepared using Clean Water Act Section 208 funds. Section 201 funding of advanced treatment at Spokane sewage treatment plant. Combined stormwater overflow correction under Section 208 water quality management planning.	Phosphorus attenuation study under Clean Water Action Section 205(j) followed by modification in descharge permit limits. Zinc study leading to possible revision in water quality standards.

Table 12 (continued)
Contaminated Fishery Waters in Region 10: Existing Actions and Control Strategies

Problem Area	Existing Actions	Control Strategies
Yakima River, Washington Sunnyside Dam to its mouth	Intensive surveys. Sewage treatment plant. Construction grants from State. Best management practices defined for dairy farming and water quality management plan developed under Clean Water Act Section 208 program for irrigated-agricultural water.	Upgrade two municipal sewage treatment plants, implement nonpoint-source controls, rely on State water quality management plan.
[illegible]	[illegible]	[illegible]
Lower Malheur River, Oregon	Water quality management plan for Malheur River developed under Clean Water Act Section 208 program. Use attainability analysis.	Rely on Statewide water quality management plan. Revise water quality standards in Malheur to reflect actual uses.
[illegible]	[illegible]	[illegible]
Tualatin River, Oregon	Advanced waste treatment to correct phosphorus problem at both sewage treatment plants. Water-quality 10-year summary by State Department of Environmental Quality on the Tualatin.	Additional study and analysis before future decisions are made as to ammonia treatment. Mathematical modelling may be appropriate.
[illegible]	[illegible]	[illegible]

Headquarters Action Needed: (1) Support and cooperate in issuing the general permit for placer miners, oil and gas exploration and seafood processors. (2) Act early to develop effluent guidelines associated with the above issues. (3) Continued support for mission contracts to prepare new-source environmental impact statements and assist in EPA participation as a cooperative agency for environmental impact statements. (4) Approve flexibility in using water quality management funding to continue development and upgrading of nonpoint-source controls. (5) Support funding for implementation of nonpoint-source controls for agriculture problems, i.e. Rural Clean Water Program funds. (6) Provide resources and technical support to allow a better determination of nonpoint-source loadings and to conduct monitoring surveys.

Expected Results

During Fiscal 83, Region 10 will issue 880 individual permits for placer miners in Alaska, eight general permits for oil and gas exploration activities and a general permit for 158 seafood processors in Alaska.

A Spokane River phosphorus-attenuation study will be completed with Clean Water Act Section 205(j) funds. The Region also will complete the environmental impact statement on the US Borax Quartz Hill molybdenum mine development with EPA participating as a cooperating agency, and issue the National Pollutant Discharge Elimination System (NPDES) permit for U.S. Borax. The Region will complete the environmental impact statement and an NPDES permit for the Red Dog lead/zinc mine, with EPA serving in a colead role with the Department of the Interior.

Progress will be measured in terms of river miles impaired for fisheries, or where fisheries are threatened. The Region expects to maintain or improve water quality and reduce use impairment for fisheries. We will be working during the year to develop a measure to indicate possible reestablishment of fisheries.

Introduction to Attachment A

The primary objective of this section is to present the environmental status, by media, for all geographic areas in Region 10 for which data are available. State and local agency monitoring networks provide the data presented graphically in this section.

Attachment A discusses the general methodology used to analyze and present data. Where there are exceptions to the general methodology, qualifications to the information presented, or specific information which is applicable only to a particular graphic or table, that information is highlighted. Additionally, where appropriate, the sources of data and information are identified.

Attachment A is not intended to present nor discuss program-related information, with the exception of Radiation and Pesticides programs, that is not addressed in Section II.

Hazardous Waste

Figure 1
Potential Hazardous Waste Sites in Region 10

NUMBERS INSIDE THE COUNTY OR BOROUGH BOUNDARIES INDICATE THE NUMBER OF SITES WHICH MAY CONTAIN HAZARDOUS WASTES WITHIN EACH COUNTY OR BOROUGH

The graphics shown provide an overview of hazardous waste generation and disposal in Region 10. From 1940 through 1975 a total of 2.6 MMT of hazardous waste was generated.

The map, Figure 1, shows the counties with disposal sites in the region. The numbers inside the county or borough boundaries indicate the number of disposal sites most likely to contain hazardous wastes. These sites are concentrated in the more densely populated counties of Western Washington.

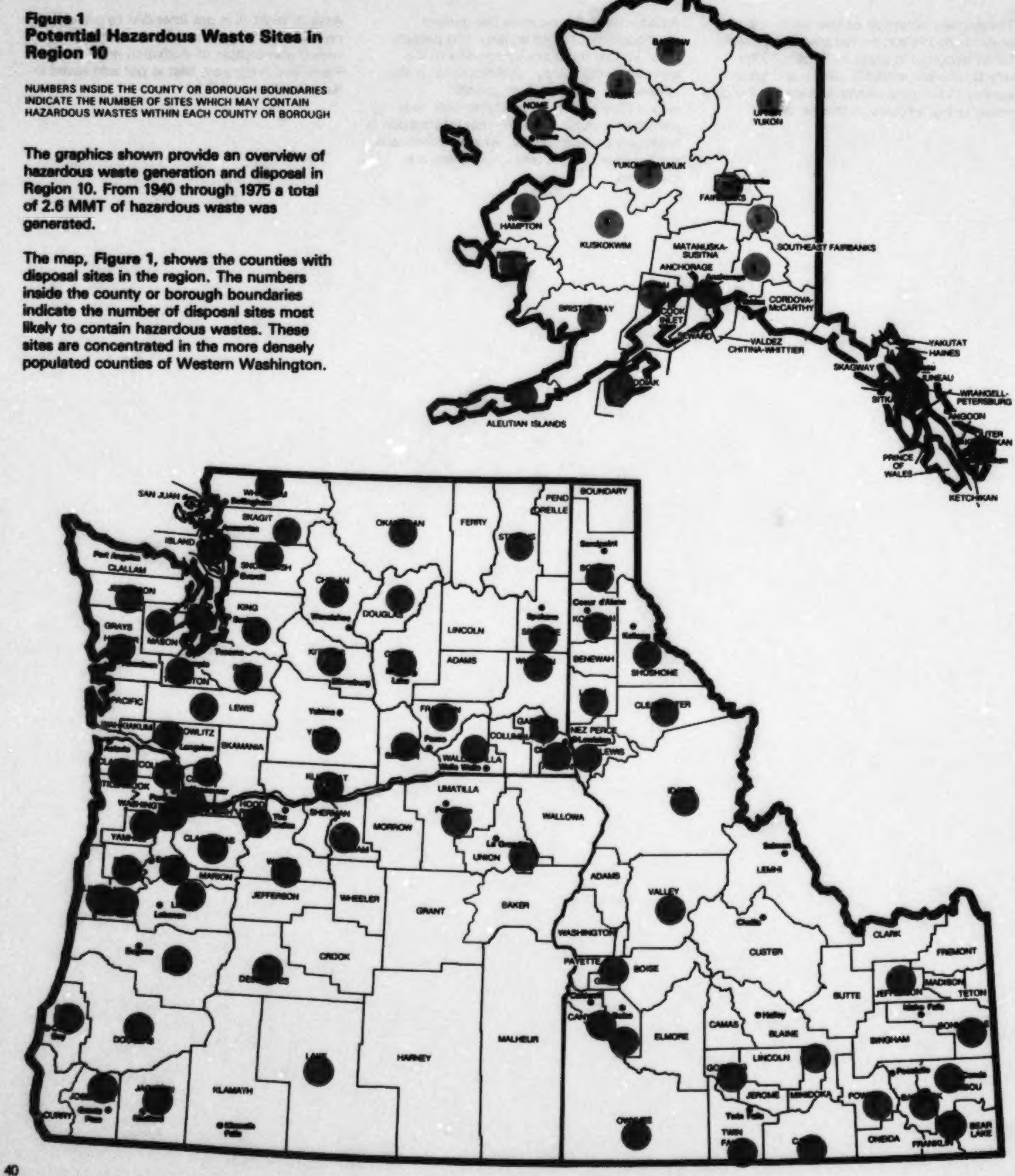

NOME
UPPER YUKON
YUKON-KOYUKUK
FAIRBANKS
WADE HAMPTON
KUSKOKWIM
MATANUSKA-SUSITNA
ANCHORAGE
SOUTHEAST FAIRBANKS
CORDOVA-McCARTHY
BRISTOL BAY
COOK INLET
SEWARD
VALDEZ CHITINA-WHITTIER
KODIAK
ALEUTIAN ISLANDS
YAKUTAT
HAINES
SKAGWAY
JUNEAU
WRANGELL-PETERSBURG
SITKA
ANGOON
PRINCE OF WALES
KETCHIKAN
SAN JUAN
SKAGIT
ISLAND
Port Angeles
CLALLAM
SNOHOMISH
Everett
GRAYS HARBOR
MASON
KING
PACIFIC
LEWIS
COWLITZ
SKAMANIA
CHELAN
Wenatchee
DOUGLAS
OKANOGAN
FERRY
PEND OREILLE
BOUNDARY
Sandpoint
LINCOLN
Spokane
Coeur d'Alene
ADAMS
BENEWAH
Kellogg
SHOSHONE
Yakima
Ellensburg
CLEARWATER
Pasco
COLUMBIA
NEZ PERCE
LEWIS
Walla Walla
KLICKITAT
UMATILLA
WALLOWA
MORROW
SHERMAN
The Dalles
La Grande
UNION
MARION
JEFFERSON
WHEELER
GRANT
BAKER
Lebanon
ADAMS
VALLEY
LEMHI
Salmon
Challis
CUSTER
CLARK
FREMONT
WASHINGTON
PAYETTE
BOISE
MADISON
TETON
BUTTE
Idaho Falls
CROOK
Eugene
ELMORE
CAMAS
Hailey
BLAINE
BINGHAM
MALHEUR
HARNEY
LINCOLN
Pocatello
KLAMATH
Klamath Falls
JEROME
MINIDOKA
Twin Falls
TWIN FALLS
ONEIDA
FRANKLIN
BEAR LAKE
CURRY
Grants Pass

Figure 2

Hazardous Wastes Generated 1940-1975

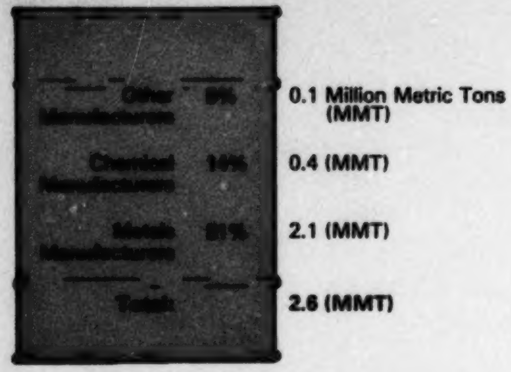
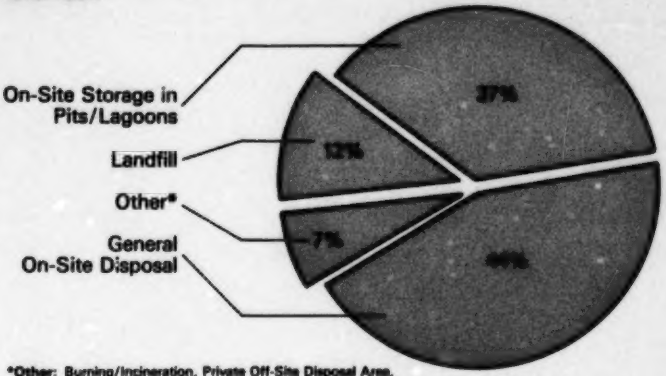


Figure 3

Hazardous Wastes Disposal Methods 1940-1975



*Other: Burning/Incineration, Private Off-Site Disposal Area, Sewered, Recycled/Reprocessor, Private Hauler, Scrap Dealers, Unknown

Hazardous Waste

Figure 2 shows the categories of manufacturers which generated the wastes. Metal manufacturers contributed 81 percent of the total; nearly all attributable to aluminum production. The other 19 percent was from chemical and other manufacturers.

The pie chart, **Figure 3**, illustrates the methods employed in the disposal of the 2.6 MMT of hazardous wastes that were generated. About 81 percent was disposed of on-site. Of the remainder, approximately 12 percent was sent to landfills. The 7 percent balance represents wastes that were either burned, incinerated, sewered, recycled, sent off to private disposal areas, reprocessed or disposed of in some unknown manner.

Air Quality

Air

The following graphic displays provide an in-depth picture of air quality for the region. Maps show the geographic distribution of areas with air quality measurements in excess of National Ambient Air Quality Standards (NAAQS). Bar graphs are used to show frequency of standard exceedances and air quality trends. Information provided in the air graphics is based on data through 1981 only, the last full calendar year for which air quality data is available. The severity determinations are based upon comparisons of highest recorded values with NAAQS and EPA's recommended *"alert"* levels as shown below.

POLLUTANT	UNITS	AVERAGING TIME	SECONDARY STANDARD	PRIMARY STANDARD	ALERT LEVEL
TSP	ug/m^3	annual geometric mean	60	75	
	ug/m^3	24 hour average	150	260	375
CO	mg/m^3	8 hour average	10	10	17
O_3	ug/m^3	1 hour average	235	235	392
	ppm	1 hour average	0.12	0.12	0.2
SO_2	ug/m^3	annual arithmetic mean		80	
		24 hour average		365	800
		3 hour average	1,300		

Preceding page blank

Air Quality

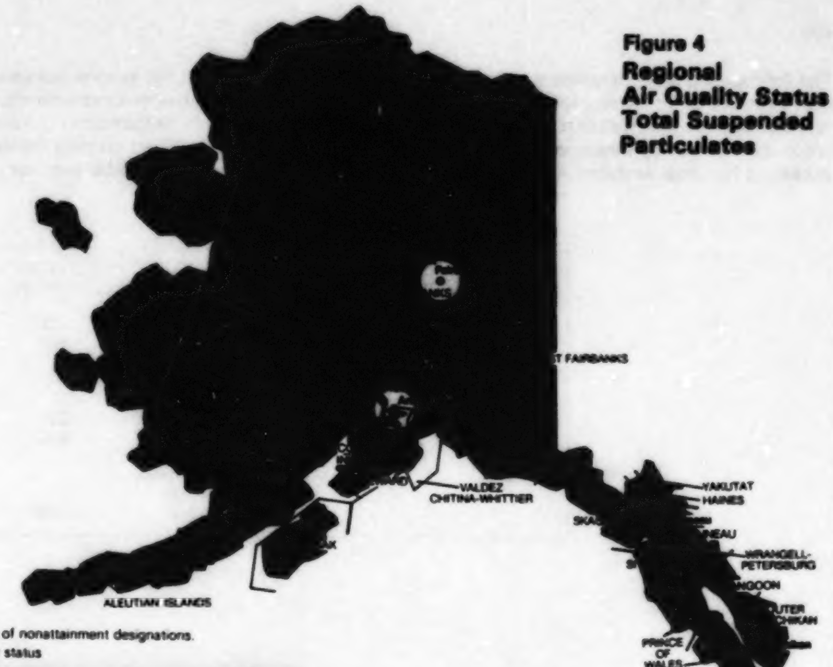
Total Suspended Particulates

The TSP air quality map (Figure 4) shows the general areas in each state which, in 1981, exceeded ambient air quality standards. In areas where there is more than one monitor, the exceedance information represents the worst site. It should be noted that an exceedance is not necessarily a violation since the standards allow for one exceedance of a short term standard in each calendar year. Color codes provide information on the relative severity of highest recorded concentrations.

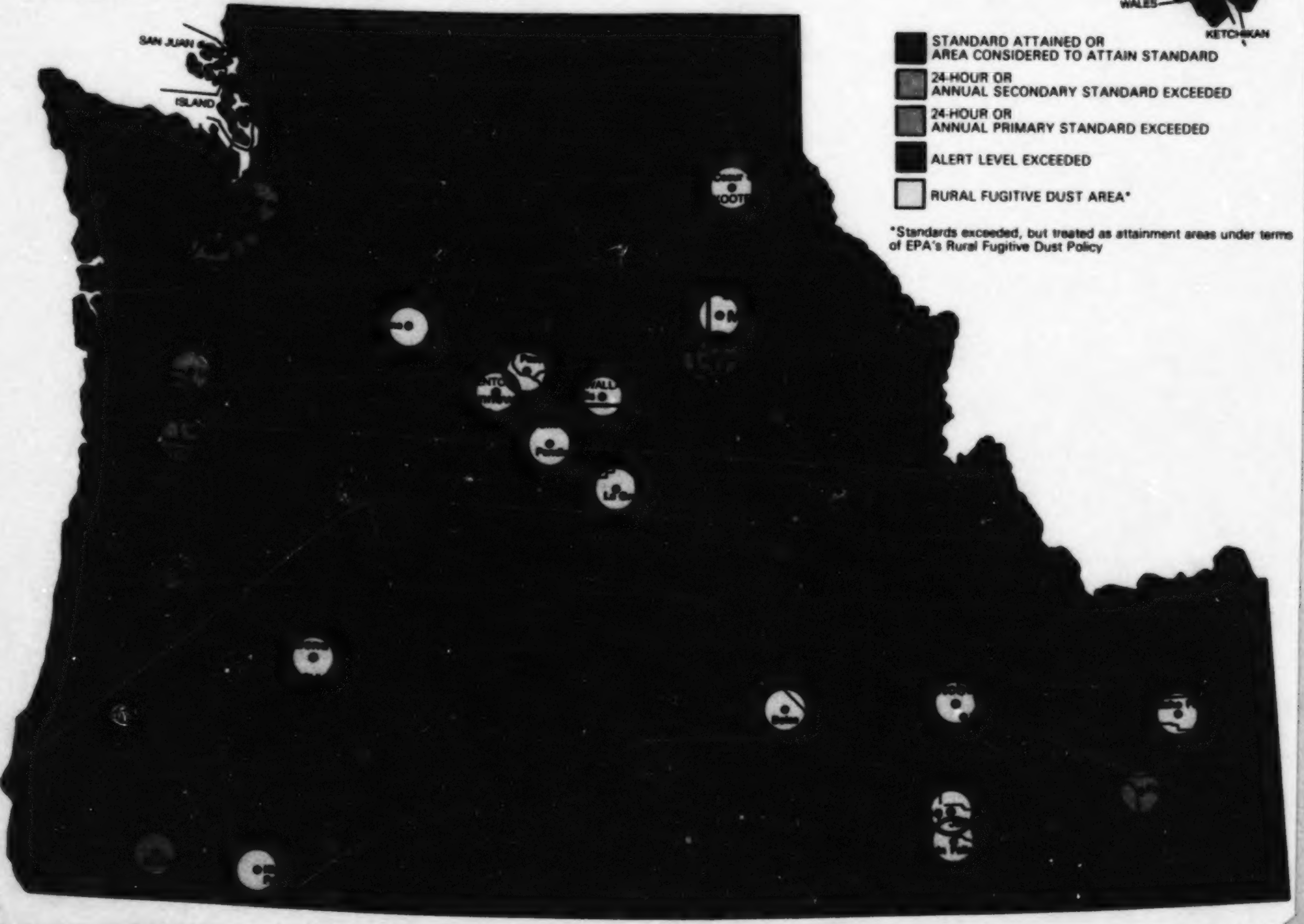
Note: Kellogg, Idaho air quality has significantly changed since 1981. A lead and zinc smelter which has dominated the particulate matter emission inventory ceased operating between late 1981 and early 1982. Corresponding improvements in air quality have been noted.

Additionally, the status of TSP in Olympia, Washington, as shown in Figures 4, 8 and 12 are biased by the impact of building fires on the two days during calendar year 1981 when secondary standards were exceeded.

Figure 4
Regional Air Quality Status Total Suspended Particulates



Note:
- This map reflects 1981 Air Quality Data and not necessarily the current status of nonattainment designations.
- See the accompanying narrative for a discussion of Kellogg Idaho's air quality status



■ STANDARD ATTAINED OR AREA CONSIDERED TO ATTAIN STANDARD
▨ 24-HOUR OR ANNUAL SECONDARY STANDARD EXCEEDED
▨ 24-HOUR OR ANNUAL PRIMARY STANDARD EXCEEDED
■ ALERT LEVEL EXCEEDED
☐ RURAL FUGITIVE DUST AREA*

*Standards exceeded, but treated as attainment areas under terms of EPA's Rural Fugitive Dust Policy

Total Suspended Particulates

Areas where exceedances of either the secondary and/or primary NAAQS for TSP occurred in 1981 were selected for analysis. All TSP monitoring sites within a given area were divided, as appropriate, into one of three categories: commercial/industrial (C/I), residential (R) or rural (r). Data from all sites in each category were pooled and master files created containing each category's maximum value for every day sampled. Each category's file of daily maximums was then searched to yield the total number of days during 1981 when an exceedance of the 24-hour NAAQS for TSP was observed.

A simple percentage of observed exceedance days to all sample days was calculated for each category of sites within the subject area. The results are presented in **Figure 5**.

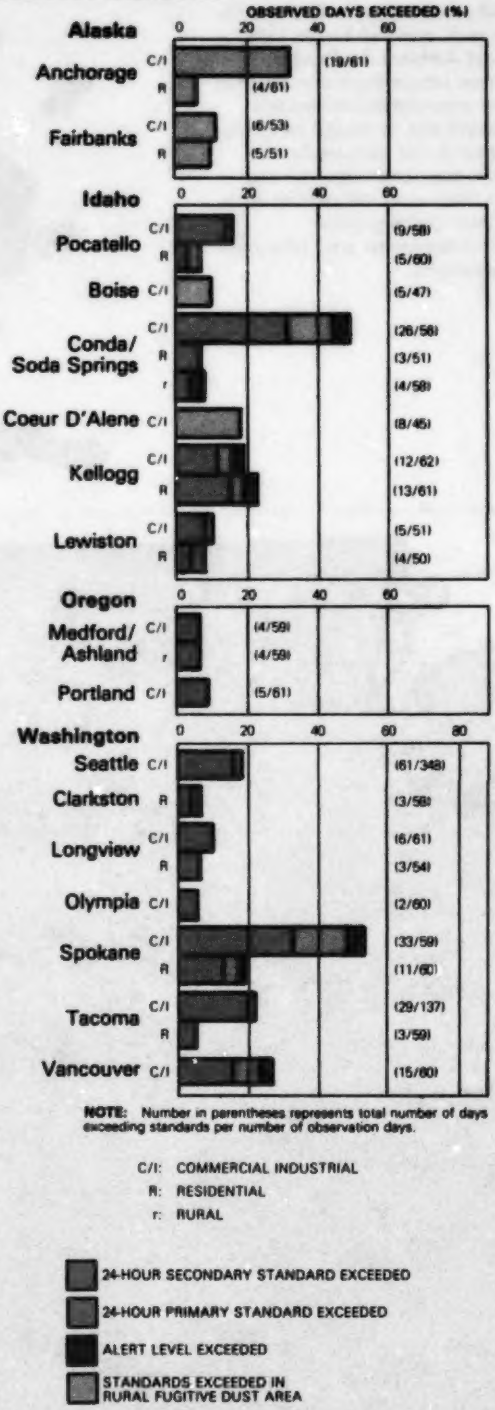
Bar lengths are scaled to correspond to the percentage of exceedance days to all sampled days. Some of the bars have as many as three different colored sections representing the severity of the exceedances and are color coded as per the legend. Where exceedances have been attributed solely to rural fugitive dust the entire bars have been colored blue-brown.

It should be noted that the percent exceedance data displayed are not adequate to define the spatial extent and severity of areas in violation of standards. Region 10 and the states are presently conducting intensive special studies in some areas for this purpose.

It should be noted that air pollution *"alerts"* are called on the basis of both measured air quality and the prediction that these high pollution concentrations will continue. Thus, even though alert levels are reached, an air pollution alert is not announced if meteorological predictions indicate that pollutants will be dispersed within 24 hours.

Figure 5

Percent of Observed Days
Total Suspended Particulates
Exceeded Standards



NOTE: Number in parentheses represents total number of days exceeding standards per number of observation days.

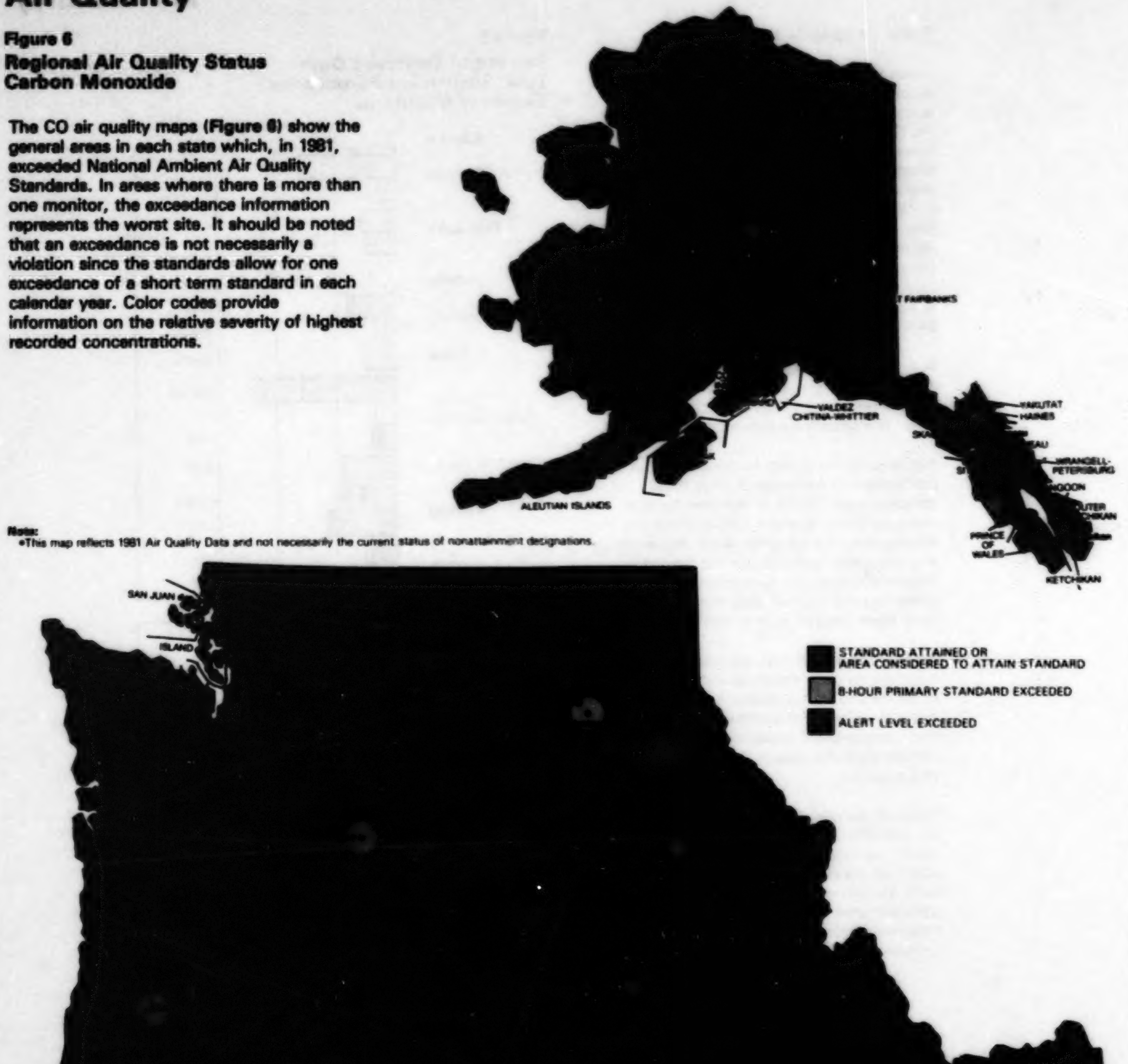
C/I: COMMERCIAL INDUSTRIAL
R: RESIDENTIAL
r: RURAL

▨ 24-HOUR SECONDARY STANDARD EXCEEDED
▨ 24-HOUR PRIMARY STANDARD EXCEEDED
■ ALERT LEVEL EXCEEDED
▨ STANDARDS EXCEEDED IN RURAL FUGITIVE DUST AREA

Air Quality

Figure 6
Regional Air Quality Status
Carbon Monoxide

The CO air quality maps (Figure 6) show the general areas in each state which, in 1981, exceeded National Ambient Air Quality Standards. In areas where there is more than one monitor, the exceedance information represents the worst site. It should be noted that an exceedance is not necessarily a violation since the standards allow for one exceedance of a short term standard in each calendar year. Color codes provide information on the relative severity of highest recorded concentrations.


FAIRBANKS
VALDEZ
CHITINA-WHITTIER
YAKUTAT
HAINES
WRANGELL-PETERSBURG
PRINCE OF WALES
KETCHIKAN
ALEUTIAN ISLANDS
SAN JUAN
ISLAND

Note:
•This map reflects 1981 Air Quality Data and not necessarily the current status of nonattainment designations.

- ■ STANDARD ATTAINED OR AREA CONSIDERED TO ATTAIN STANDARD
- ■ 8-HOUR PRIMARY STANDARD EXCEEDED
- ■ ALERT LEVEL EXCEEDED

Carbon Monoxide

Areas where exceedances of the primary 8-hour NAAQS for CO (primary and secondary standards are identical) occurred in 1981 were selected for further analysis. All CO sites within each subject area were grouped, as appropriate, into one of two categories: commercial/industrial (C/I) or residential (R). Data from all sites within each category were pooled and master files created containing each category's maximum 8-hour average concentration for every day monitored. Each category's file of daily maximums was then searched to yield the total number of days when an exceedance of the 8-hour NAAQS for CO was observed. The percentage of observed exceedance days to all monitored days was calculated for each category of sites within the subject area. The results are presented in Figure 7.

Bar lengths are scaled to correspond to the percentage of exceedance days to all monitored days. Some bars have two different color sections coded per the legend which represent the severity of the exceedances.

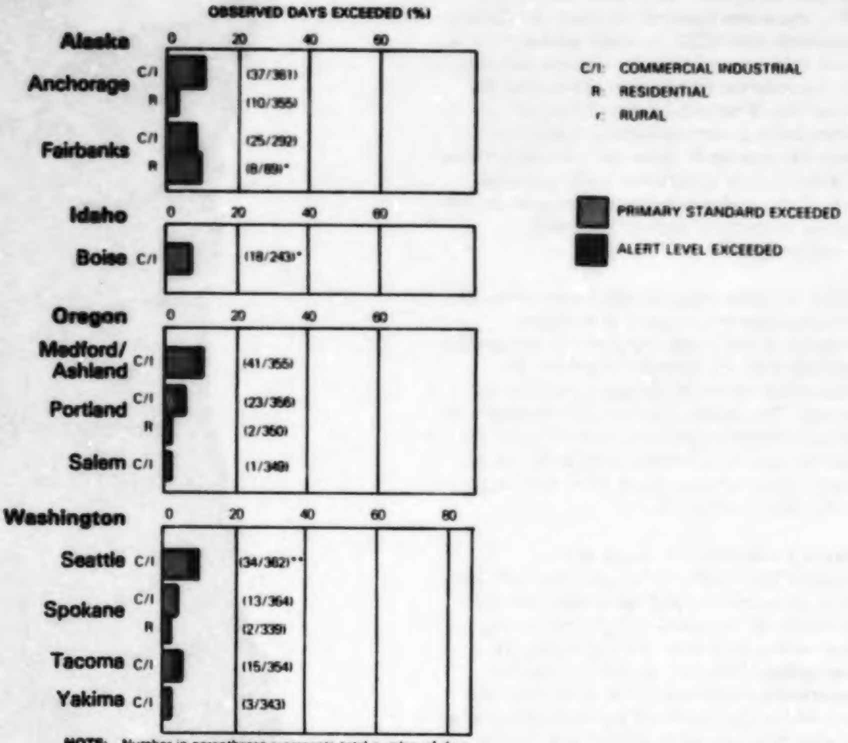
The Clean Air Act provides states the option of establishing both their own air quality standards and monitoring data interpretation techniques so long as healthful air quality is protected. As a result, there may be differences between state and EPA counts of standards exceedances.

It should be noted that the percent exceedance data displayed are not adequate to define the spatial extent and severity of areas in violation of standards. Region 10 and the states are presently conducting intensive special studies in some areas for this purpose.

It should be further noted that air pollution *"alerts"* are called on the basis of both measured air quality and the prediction that these high pollution concentrations will continue. Thus, even though alert levels are reached, an air pollution alert is not announced if meteorological predictions indicate that pollutants will be dispersed within 24 hours.

Figure 7

Percent of Observed Days Carbon Monoxide Exceeded Standards



NOTE: Number in parentheses represents total number of days exceeding standards per number of observation days.

*May not be representative of total problem. Less than 75% of total observation days reported.

**Bellevue was considered together with Seattle.

Air Quality

Ozone

The Ozone air quality maps (Figure 8) show the general areas in each state which, in 1981, exceeded National Ambient Air Quality Standards (NAAQS). In areas where there is more than one monitor for a given pollutant, the exceedance information represents the worst site. It should be noted that an exceedance is not necessarily a violation since the standards allow for one exceedance of a short term standard in each calendar year. Color codes provide information on the relative severity of highest recorded concentrations.

Ozone typically impacts areas well-removed from the plumes' origin. For example, elevated ozone levels measured in the greater Tacoma area are thought to reflect the cumulative impact of Tacoma and Seattle plumes. The greater Seattle area experiences its own ozone impacts on a lesser scale than Tacoma and of uncertain origins. Similarly, Salem's ozone impacts are attributed in part to Portland's urban plume.

Figure 9 identifies the areas where exceedances of the 1-hour primary NAAQS for O_3 (the primary and secondary NAAQS are identical) occurred. All O_3 monitoring sites within each area were grouped, as appropriate, into one of three categories: commercial/industrial (C/I), residential (R), or rural (r). Data from all the monitoring sites in each category were pooled and master files created containing each category's maximum 1-hour concentration for every day monitored. Each category's file of daily maximums was then searched to yield the total number of days when an exceedance of the NAAQS for O_3 was observed. The percentage of observed exceedance days to all monitored days was calculated. The results are shown in the bar charts.

Figure 8

Washington and Oregon Air Quality Status Ozone

SAN JUAN
ISLAND

Note:
•This map reflects 1981 Air Quality Data and not necessarily the current status of nonattainment designations.

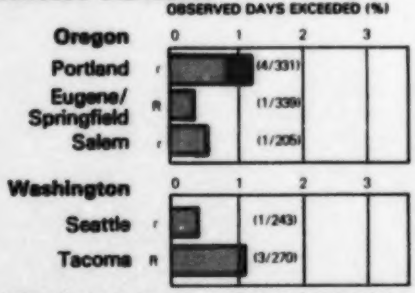
■ STANDARD ATTAINED OR AREA CONSIDERED TO ATTAIN STANDARD

■ 1-HOUR PRIMARY STANDARD EXCEEDED

■ ALERT LEVEL EXCEEDED

Figure 9

Percent of Observed Days Ozone Exceeded Standards



NOTE: Number in parentheses represents total number of days exceeding standards per number of observation days.

C/I: COMMERCIAL INDUSTRIAL
R: RESIDENTIAL
r: RURAL

■ PRIMARY STANDARD EXCEEDED

■ ALERT LEVEL EXCEEDED

Bar lengths are scaled to correspond to the percentage of exceedance days to all monitored days. The bar for Portland has two different colored sections corresponding to the severity of the exceedances and color coded as per legend.

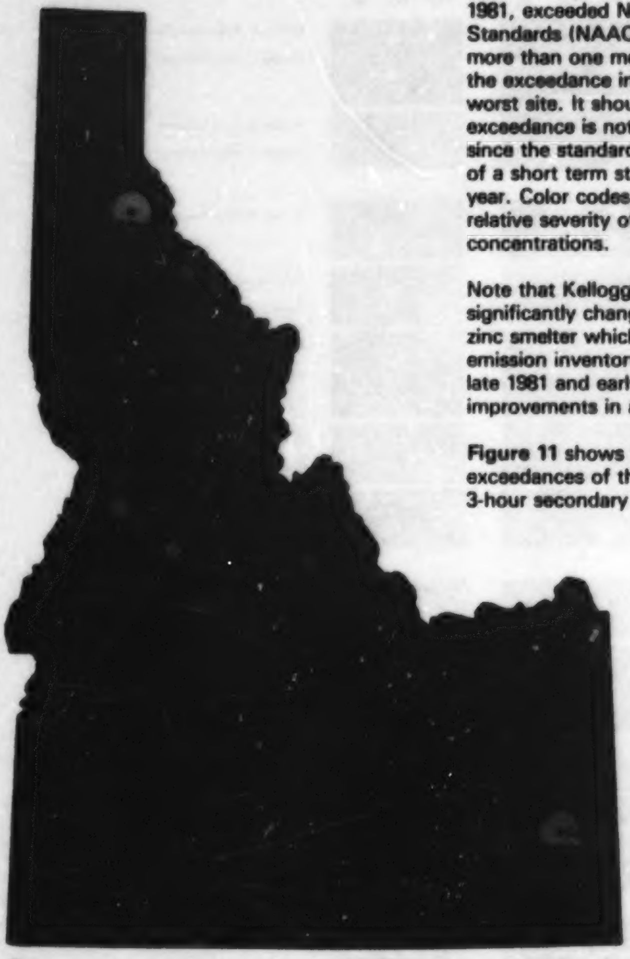
The Clean Air Act provides states the option of establishing both their own air quality standards and monitoring data interpretation techniques so long as healthful air quality is protected. As a result, there may be differences between state and EPA counts of standards exceedances.

It should be noted that the percent exceedance data displayed are not adequate to define the spatial extant and severity of areas in violation of standards. Region 10 and the states are presently conducting intensive special studies in some areas for this purpose.

It should be further noted that air pollution *"alerts"* are called on the basis of both measured air quality and the prediction that these high pollution concentrations will continue. Thus, even though alert levels are reached, an air pollution alert is not announced if meteorological predictions indicate that pollutants will be dispersed within 24 hours.

Figure 10

Idaho Air Quality Status Sulfur Dioxide



Note:
- This map reflects 1981 Air Quality Data and not necessarily the current status of nonattainment designations.
- See the accompanying narrative for a discussion of Kellogg Idaho's air quality status

■ STANDARD ATTAINED OR AREA CONSIDERED TO ATTAIN STANDARD

▨ SECONDARY STANDARD EXCEEDED

□ PRIMARY STANDARD EXCEEDED

Sulfur Dioxide

The sulfur dioxide air quality map (**Figure 10**) shows the general areas in Idaho which, in 1981, exceeded National Ambient Air Quality Standards (NAAQS). In areas where there is more than one monitor for a given pollutant, the exceedance information represents the worst site. It should be noted that an exceedance is not necessarily a violation since the standards allow for one exceedance of a short term standard in each calendar year. Color codes provide information on the relative severity of highest recorded concentrations.

Note that Kellogg, Idaho air quality has significantly changed since 1981. A lead and zinc smelter which has dominated the SO_2 emission inventory ceased operating between late 1981 and early 1982. Corresponding improvements in air quality have been noted.

Figure 11 shows the areas in Idaho where exceedances of the 24-hour primary and 3-hour secondary NAAQS for SO_2 occurred in 1981. All SO_2 monitoring sites within each area were grouped, as appropriate, into one of two categories: commercial/industrial (C/I) and residential (R). Data from all sites within each category were pooled and master files created containing each category's maximum 3-hour and 24-hour average concentrations for every day monitored. Three-hour and 24-hour daily maximums were separated within each category and then searched to yield the total number of days during 1981 when an exceedance of either the 24-hour primary or 3-hour secondary NAAQS for SO_2 was observed. The number of both secondary and primary exceedance days were summed to yield the total number of exceedance days. A simple percentage of observed exceedance days to all monitored days was calculated for each category of sites within the subject area.

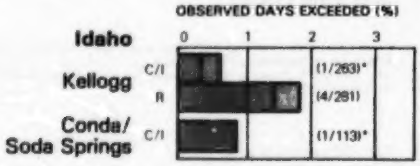
The bar lengths are scaled to correspond to the percentage of days during which either the primary or secondary standards or both were exceeded compared to all monitored days.

Two of the three bars have two different colored sections corresponding to the severity of the exceedances and are color coded consistent with the legend.

It should be noted that the percent exceedance data displayed are not adequate to define the spatial extent and severity of areas in violation of standards. Region 10 and the states are presently conducting intensive special studies in some areas for this purpose.

Figure 11

Percent of Observed Days Sulfur Dioxide Exceeded Standards



NOTE: Primary and secondary standards are for different time intervals. As a result, the primary standard may be exceeded while the secondary standard may or may not be exceeded, hence the above graphs indicate the exceedance day total of both primary and secondary exceedance days.

Number in parentheses represents total number of days exceeding standards per number of observation days.

The lead and zinc smelter which dominated the Kellogg sulfur dioxide emission inventory through most of 1981 has ceased operation. Area now designated "Unclassifiable".

*May not be representative of total problem. Less than 75% of total observation days reported.

C/I: COMMERCIAL INDUSTRIAL
R: RESIDENTIAL
r: RURAL

▨ SECONDARY STANDARD EXCEEDED

□ PRIMARY STANDARD EXCEEDED

Air Quality

Air Quality Trends

Figure 12 identifies the general areas within each state in Region 10 which exceeded National Ambient Air Quality Standards in 1981 for at least one pollutant. The graphics also indicate the areas where air quality is changing and the direction of that change.

The suspected source(s) of the air quality problem(s) in each area are shown. The sources are generally categorized as follows: mobile (e.g. automobile primarily for CO, NO_2 and O_3), area (e.g. windblown dust, space heating, etc. primarily for TSP) and point (e.g. industrial facilities primarily for TSP and SO_2).

Two rank order correlation statistics were used to test for trends. Spearman's rho tested for trend in annual averages, and the Sen test recommended by Farrell (1980) tested for trend for short term averages. The Sen test was used for short term averages becauses it includes a procedure for removing seasonal effects. Both tests use ranks (e.g., first, second, third. . .) rather than measured values in their calculations, so they are insensitive to departures from normality.

A trend was declared if the statistic was significant at probability equal or less than 0.20, two tailed. This is a generous significance level, and there is a real possibility that some of the observed "trends" are simply the result of random fluctuation. On the other hand, the generous significance level reduces the chances of missing any real changes. Three years of data were required.

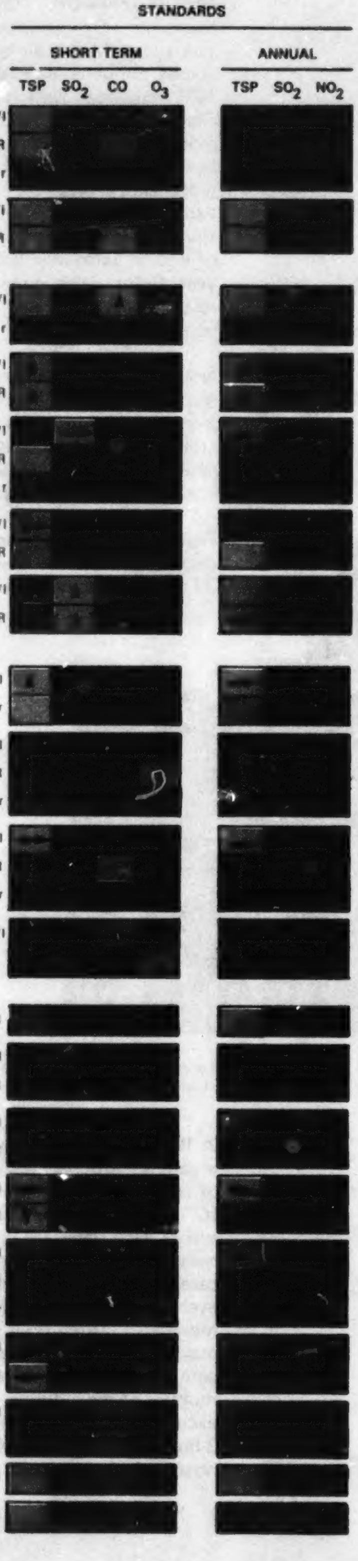
Note: The dark blue legend includes areas where monitoring data shows no exceedances of standards and areas where no monitoring was attempted. Areas where no monitoring was attempted are considered to attain standards.

C/I COMMERCIAL INDUSTRIAL
R RESIDENTIAL
r RURAL

■ STANDARD ATTAINED OR CONSIDERED TO ATTAIN STANDARD
■ SECONDARY STANDARD EXCEEDED
■ PRIMARY STANDARD EXCEEDED
■ ALERT LEVEL EXCEEDED
■ FUGITIVE DUST AREA
▲ IMPROVING TREND
▼ DETERIORATING TREND
◄► NO SIGNIFICANT TREND
☐ DATA INSUFFICIENT TO CALCULATE TREND

*Trends not indicated for Rural Fugitive Dust Areas

Figure 12
Air Quality Trends (1976-1981)



AREAS MONITORED		CAUSE OF PROBLEM
Alaska		
Anchorage*	C/I	Mobile & Area Sources
	R	Mobile & Area Sources
	r	
Fairbanks*	C/I	Mobile & Area Sources
	R	Mobile & Area Sources
Idaho		
Boise*	C/I	Mobile & Area Sources
	r	
Pocatello	C/I	Point & Area Sources
	R	Point & Area Sources
Conda/ Soda Springs	C/I	Point & Area Sources
	R	Point & Area Sources
	r	Point & Area Sources
Lewiston	C/I	Point & Area Sources
	R	Point & Area Sources
Kellogg	C/I	Point Sources
	R	Point Sources
Oregon		
Medford/ Ashland	C/I	Mobile, Area & Point Sources
	r	Area Sources
Eugene/ Springfield	C/I	
	R	Mobile, Point & Area Sources
	r	
Portland	C/I	Mobile, Area & Point Sources
	R	Mobile Sources
	r	Mobile Sources
Salem	C/I	Mobile Sources
	r	Mobile & Area Sources
Washington		
Clarkston	R	Mobile, Point & Area Sources
Port Angeles	C/I	
	R	
Vancouver	C/I	Point & Area Sources
	R	
Longview	C/I	Point & Area Sources
	R	Point & Area Sources
Seattle	C/I	Mobile, Area & Point Sources
	R	
	r	Mobile Sources
Tacoma	C/I	Mobile, Area & Point Sources
	R	Mobile & Point Sources
Spokane	C/I	Mobile, Area & Point Sources
	R	Mobile & Area Sources
Yakima*	C/I	Mobile Sources
Olympia	C/I	Mobile & Area Sources

Air Quality

The colors represent the status of each area with respect to TSP, SO_2, CO, NO_2 and O_3 compared with short-term (averaging time less than or equal to 24 hours) and annual standards, where applicable. The arrow in a box shows if air quality is improving, deteriorating, or changing very little for the period 1976-1981. The status and trends are displayed for the three categories of monitors: commercial/industrial, residential and rural.

Air quality with respect to TSP is generally improving or changing very little in Alaska and Idaho. Only the Conda/Soda Springs area in Idaho shows a deteriorating trend. Most of Oregon shows improvement or little change in all areas. Monitors in several areas in Washington show either a deteriorating trend or little change in TSP pollution over the period of study; only Port Angeles indicated improvement in TSP values.

The bulk of the region is characterized by SO_2 levels well under the ambient standards. Those few and largely isolated areas in the region exhibiting levels exceeding the NAAQS, do so only marginally.

CO standards were exceeded in several areas in 1981. Most areas in Region 10 show improvement or little change in CO pollution.

Ozone pollution is restricted to the densely populated areas of Washington and Oregon. Ozone values are decreasing or changing very little in all areas.

It should be noted that while the ozone standard is indexed to an hourly average actual compliance is determined with respect to the average number of expected exceedances per year considering the three most recent,years of data.

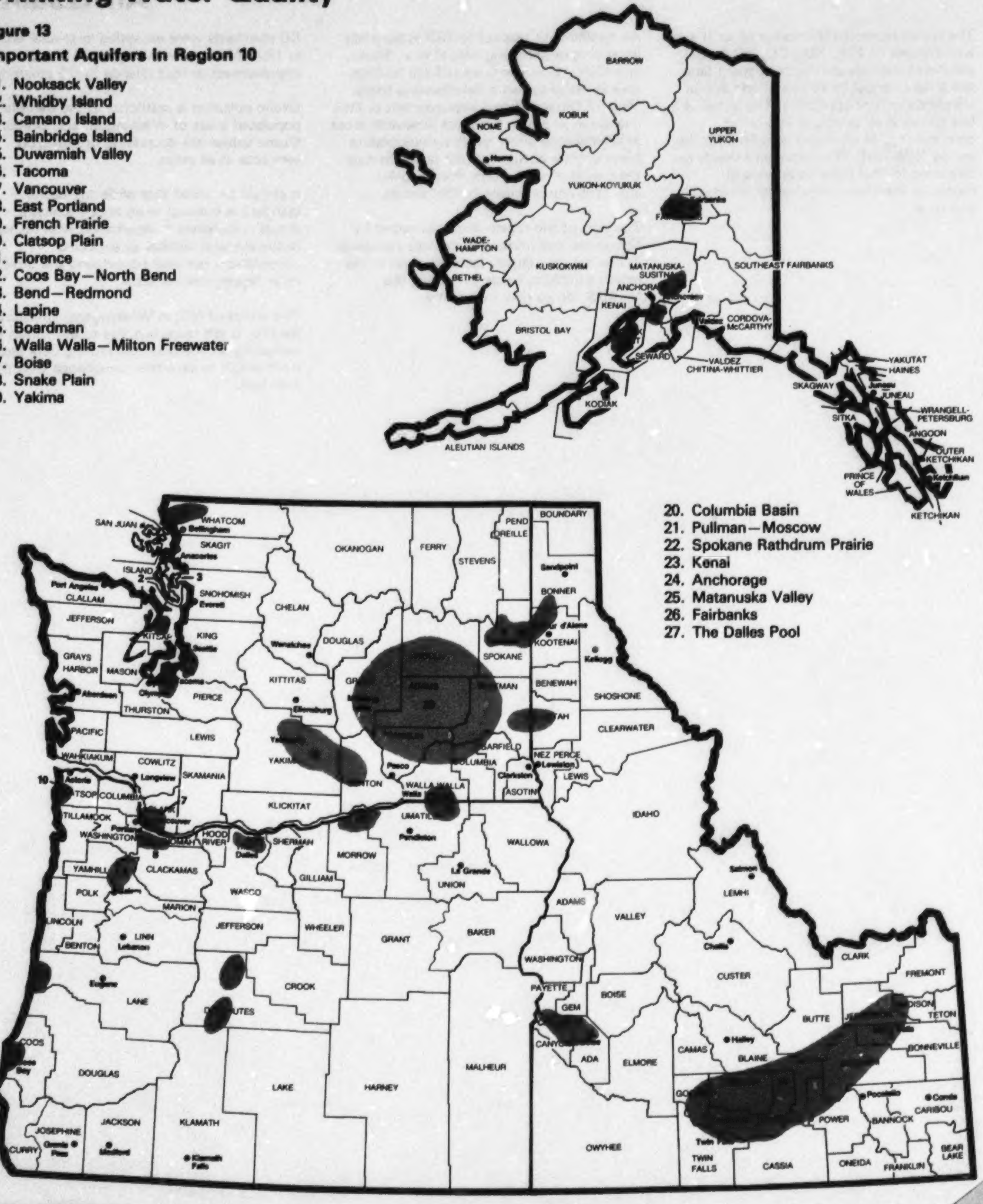
The status of NO_2 in Washington, specifically Seattle, is still uncertain due to difficulties in compiling an adequate monitoring data base from which to ascertain compliance with the standard.

Drinking Water Quality

Figure 13

Important Aquifers in Region 10

1. Nooksack Valley
2. Whidby Island
3. Camano Island
4. Bainbridge Island
5. Duwamish Valley
6. Tacoma
7. Vancouver
8. East Portland
9. French Prairie
10. Clatsop Plain
11. Florence
12. Coos Bay—North Bend
13. Bend—Redmond
14. Lapine
15. Boardman
16. Walla Walla—Milton Freewater
17. Boise
18. Snake Plain
19. Yakima



20. Columbia Basin
21. Pullman—Moscow
22. Spokane Rathdrum Prairie
23. Kenai
24. Anchorage
25. Matanuska Valley
26. Fairbanks
27. The Dalles Pool

BARROW
KOBUK
NOME
Nome
UPPER YUKON
YUKON-KOYUKUK
Fairbanks
WADE-HAMPTON
KUSKOKWIM
MATANUSKA-SUSITNA
ANCHORAGE
Anchorage
SOUTHEAST FAIRBANKS
BETHEL
KENAI
BRISTOL BAY
Valdez
CORDOVA-McCARTHY
SEWARD
VALDEZ CHITINA-WHITTIER
YAKUTAT
HAINES
SKAGWAY
Juneau
JUNEAU
WRANGELL-PETERSBURG
SITKA
ANGOON
OUTER KETCHIKAN
Ketchikan
PRINCE OF WALES
KETCHIKAN
KODIAK
ALEUTIAN ISLANDS
SAN JUAN
WHATCOM
Bellingham
SKAGIT
Anacortes
ISLAND
2
3
Port Angeles
CLALLAM
SNOHOMISH
Everett
JEFFERSON
KITSAP
KING
Seattle
GRAYS HARBOR
MASON
Aberdeen
Olympia
Tacoma
PIERCE
THURSTON
PACIFIC
LEWIS
WAHKIAKUM
COWLITZ
Longview
SKAMANIA
10
Astoria
CLATSOP
COLUMBIA
CLARK
7
Vancouver
TILLAMOOK
Portland
WASHINGTON
MULTNOMAH
HOOD RIVER
The Dalles
SHERMAN
8
YAMHILL
CLACKAMAS
POLK
Salem
MARION
LINCOLN
BENTON
LINN
Lebanon
Eugene
LANE
COOS
Coos Bay
DOUGLAS
CURRY
JOSEPHINE
Grants Pass
JACKSON
Medford
KLAMATH
Klamath Falls
LAKE
HARNEY
MALHEUR
DESCHUTES
CROOK
JEFFERSON
WASCO
WHEELER
GILLIAM
MORROW
UMATILLA
Pendleton
UNION
La Grande
WALLOWA
BAKER
GRANT
OKANOGAN
FERRY
STEVENS
PEND OREILLE
BOUNDARY
Sandpoint
BONNER
Coeur d'Alene
KOOTENAI
Kellogg
SHOSHONE
BENEWAH
CHELAN
Wenatchee
DOUGLAS
KITTITAS
Ellensburg
GRANT
LINCOLN
SPOKANE
ADAMS
WHITMAN
LATAH
CLEARWATER
FRANKLIN
GARFIELD
COLUMBIA
NEZ PERCE
Lewiston
Clarkston
ASOTIN
LEWIS
20
YAKIMA
Yakima
BENTON
Pasco
WALLA WALLA
Walla Walla
KLICKITAT
IDAHO
ADAMS
VALLEY
Salmon
LEMHI
Challis
CUSTER
WASHINGTON
PAYETTE
GEM
BOISE
CANYON
ADA
ELMORE
CAMAS
Hailey
BLAINE
BUTTE
CLARK
FREMONT
MADISON
TETON
BONNEVILLE
GOODING
Twin Falls
TWIN FALLS
CASSIA
POWER
Pocatello
BANNOCK
Grace
CARIBOU
ONEIDA
FRANKLIN
BEAR LAKE
OWYHEE

Drinking Water Quality

Drinking Water Quality

The drinking water supplied to most residents of the Pacific Northwest is considered safe, but waterborne disease outbreaks occasionally occur. In 1981, there were two outbreaks in Region 10; 300 persons became ill from these two incidents.

The Safe Drinking Water Act, passed in 1974, gave EPA primary responsibility for establishing drinking water standards, but intended that the states implement programs ensuring public water systems' compliance with standards.

In Region 10, Alaska, Idaho and Washington have assumed primary responsibility for working with public water systems to implement drinking water standards. Oregon has chosen not to assume primary responsibility. Consequently, since July 1977, EPA has worked directly with Oregon's public water systems to implement the provisions of the Safe Drinking Water Act.

The national drinking water standards address finished water quality characteristics, as measured in periodic tests. EPA recognizes that these are minimum standards and are not adequate in themselves to protect public health. Therefore, EPA encourages states to implement comprehensive programs that go beyond just addressing finished water quality.

Fiscal year 1981 represented the fourth full year of implementation of the national drinking water standards. The bacteriological data from 1981 are presented in the graphics. Table 1 shows the degree of compliance in each state while Figure 14 summarizes regional compliance. Compliance is shown both in terms of water systems and population served by the systems.

A significant percentage (19 percent) of Region 10's 4,600 community water systems are not yet conducting adequate bacteriological water quality monitoring, but the total population served by these systems is relatively small (4 percent) This indicates that the systems serve predominately small numbers of people.

Fourteen percent of the Region's water systems, which serve approximately 7 percent of the population, experienced either major or minor bacteriological standard violations during FY 81. Likewise, these are predominately the Region's smaller public water systems.

Approximately half the population in Region 10 uses surface water as the source of water supply, with the remaining population relying on ground water. Almost 90 percent of the community water systems, however, use ground water, demonstrating the importance of this resource. Major municipalities in Region 10 such as Seattle, Portland and Anchorage use surface water in whole or in part, while Spokane, Boise and Fairbanks use ground water.

The maps on the facing page, Figure 13, show the most important drinking water aquifers in the region. While most of these aquifers yield high quality ground water, contamination has occurred in such aquifers as the Spokane-Rathdrum Prairie, Tacoma, and East Portland aquifers.

Three aquifers in the region, Spokane-Rathdrum Prairie, Whidbey, and Camano have been designated as *"sole source"* aquifers. Designation of a fourth, the Snake Plain, is pending. After designation takes place, construction projects receiving federal financial assistance that have the potential for polluting the aquifer would be subject to a special EPA review to make sure such contamination does not occur. Since cleaning up a contaminated aquifer is so difficult, preventive actions like sole source project reviews are particularly important.

Table 1
Compliance with EPA Drinking Water Standards

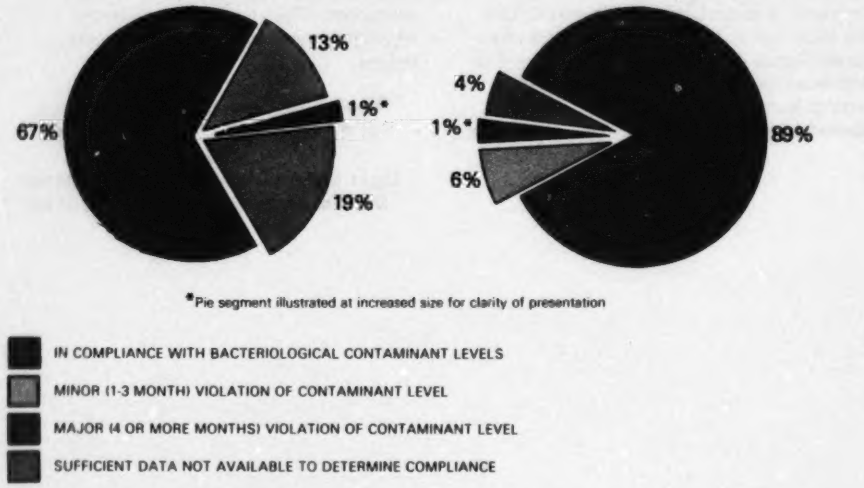
a. Community Water Systems

	IN COMPLIANCE WITH BACTERIOLOGICAL STANDARDS	INSUFFICIENT DATA TO DETERMINE COMPLIANCE	MINOR VIOLATION OF BACTERIOLOGICAL CONTAMINANT LEVEL	MAJOR VIOLATION OF BACTERIOLOGICAL CONTAMINANT LEVEL
Alaska	[illegible]	[illegible]	[illegible]	[illegible]
Idaho	[illegible]	[illegible] (23%)	220 (26%)	[illegible]
Oregon	[illegible]	34 (4%)	61 (5%)	[illegible]
Washington	[illegible]	[illegible]	[illegible]	[illegible]

b. Persons Served by Community Water Systems (In Thousands)

	IN COMPLIANCE WITH BACTERIOLOGICAL STANDARDS	INSUFFICIENT DATA TO DETERMINE COMPLIANCE	MINOR VIOLATION OF BACTERIOLOGICAL CONTAMINANT LEVEL	MAJOR VIOLATION OF BACTERIOLOGICAL CONTAMINANT LEVEL
Alaska	[illegible]	[illegible]	6 (1%)	[illegible]
Idaho	[illegible]	36 (5%)	176 (25%)	[illegible]
Oregon	[illegible]	47 (2%)	52 (3%)	[illegible]
Washington	[illegible]	[illegible]	[illegible]	[illegible]

Figure 14



a. Regional Summary Based on Percentage of Community Water Systems

b. Regional Summary Based on Population Served by Community Water Systems

*Pie segment illustrated at increased size for clarity of presentation

River Water Quality

River Water Quality

How River Water Quality Is Determined

The Federal Water Pollution Control Act of 1972 set as a national goal - "fishable, swimmable" waters by 1983. The states in Region 10 have adopted that goal. These Region 10 states established water quality standards to protect the quality of state waters for a variety of uses, including public water supply, wildlife, fish and shellfish, recreation, navigation, agriculture, and industry. Each water use depends on certain characteristics, such as temperature, concentration of dissolved oxygen, or absence of bacteria, which can be measured and used to evaluate water quality. They vary with the chemistry of the stream being measured, the season and other factors.

To compare water quality on a regional scale, EPA Region 10 developed a standardized set of parameters and associated criteria and segregated them into ten related groups (**Table 2**). These criteria are a synthesis of Region 10 state water quality standards, recommended Federal criteria for parameters where no state standards exist, information in technical literature, and professional judgment. Like the state water quality standards this more comprehensive set of criteria is intended to define water quality levels necessary to protect human and aquatic life and the desired recreational uses of river and stream waters, and thus represents regional water quality goals. More than one criteria value based on water use may be associated with certain parameters. For example, most of the region's streams are managed to support cold water game fish species such as trout and salmon; however, some are managed as warm water fisheries, supporting bass, bullhead, etc., which require less stringent criteria.

The water quality/beneficial use status for the stream segments in Region 10 were made by comparing water quality data measured from October 1979 through September 1982 with the parameter categories shown in **Table 2**. This data is collected by various Federal, state and local agencies and stored in EPA's STORET computer system. Status was calculated per stream segment for each of the 10 parameter categories. Separate judgments of impairment were made based upon the severity and duration by which the criteria for various uses were exceeded. In addition, an overall status was generated for the segment by an aggregation of the ten categories. The status for the stream segments were divided into four color ranges:

Dark blue—Beneficial use protected.
Light blue—Beneficial use generally attained.
Light brown—Beneficial use threatened.
Dark brown—Beneficial use impaired.

Water quality status of principal rivers for each of the four states in Region 10 are shown in the maps (**Figures 15, 19, 22** and **24**). Each map displays the major river segments and their associated beneficial use status through the use of the four color ranges. This status was determined by an aggregation of the 10 parameter categories per segment. A judgment was also made regarding the most sensitive use and/or the worst three consecutive months. This approach provides an indication of worst case water quality problems occurring on a seasonal basis.

Box chart displays for major stream segments in each state are also presented. The water quality/beneficial use status for each of the 10 parameter categories per stream segment are shown according to the most sensitive use and/or the worst three consecutive months. In addition, where possible an arrow indicating whether a statistically significant trend of improving or deteriorating status was present is displayed based upon the last five to nine years of water quality data.

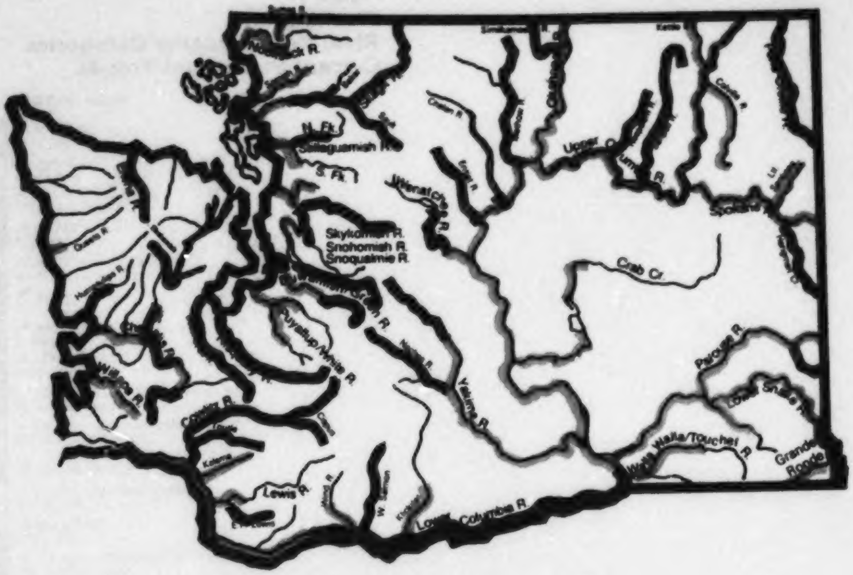
River Water Quality

A Water Quality Index (WQI) developed by Region 10 was used as the major input for the determination of river segment status in Washington. State standards were used in the WQI calculations where appropriate in lieu of Federal criteria.

The box charts **(Figures 16, 17 and 18)** represent 97 segments covering approximately 4,230 stream miles. The overall status for 11 of the segments could not be determined due to the lack of sufficient water quality information.

Modified turbidity and suspended solids criteria were used in the determination of the segment status for glacial fed rivers such as the Nooksack, Sauk, Puyallup, White and Nisqually.

The deteriorating trend and impaired status for the aesthetic (turbidity) and solids categories in the Toutle and Cowlitz River segments are a result of the volcanic debris from the 1980 Mt. St. Helens' eruption.



BASED UPON THE MOST SENSITIVE BENEFICIAL USE

- ■ BENEFICIAL USE PROTECTED
- ▩ BENEFICIAL USE GENERALLY ATTAINED
- ▨ BENEFICIAL USE THREATENED
- ■ BENEFICIAL USE IMPAIRED
- ☐ NO DATA

Figure 15
Water Quality Status of Washington's Principal Rivers

Table 2
Criteria Categories for River Water Quality

Temperature—Water temperature influences the type of fish and other aquatic life that can survive in a river. High temperatures can be detrimental to fish spawning and rearing.

Dissolved Oxygen—Fish and aquatic life must have certain levels of oxygen in the water to survive. Low oxygen concentration or saturation levels can be detrimental to these organisms.

pH—pH is the measure of the hydrogen ion concentration in water and determines whether the water is acidic or basic. Extreme levels of either can imperil fish and aquatic life.

Bacteria—Bacteria indicate probable presence of disease-related organisms and viruses from human sewage or animal waste.

Trophic—Indicates the extent of algae or nutrients in water. Nutrients promote algae growth. When algae flourish they make the water murky and the growths make swimming and fishing unpleasant. Decomposition of dead algae can decrease dissolved oxygen concentrations to levels harmful to fish.

Aesthetics—Refers to oil, grease, turbidity and algae blooms which are visually unpleasant. Generally this group is represented by either turbidity or chlorophyll a. Turbidity is a measure of the clarity of the water. Chlorophyll a provides a measure of suspended algae in the water.

Solids—Dissolved minerals or suspended material such as mud or silt. Excess dissolved minerals interfere with agricultural, industrial and domestic use. Excess suspended solids adversely affect fish feeding and spawning.

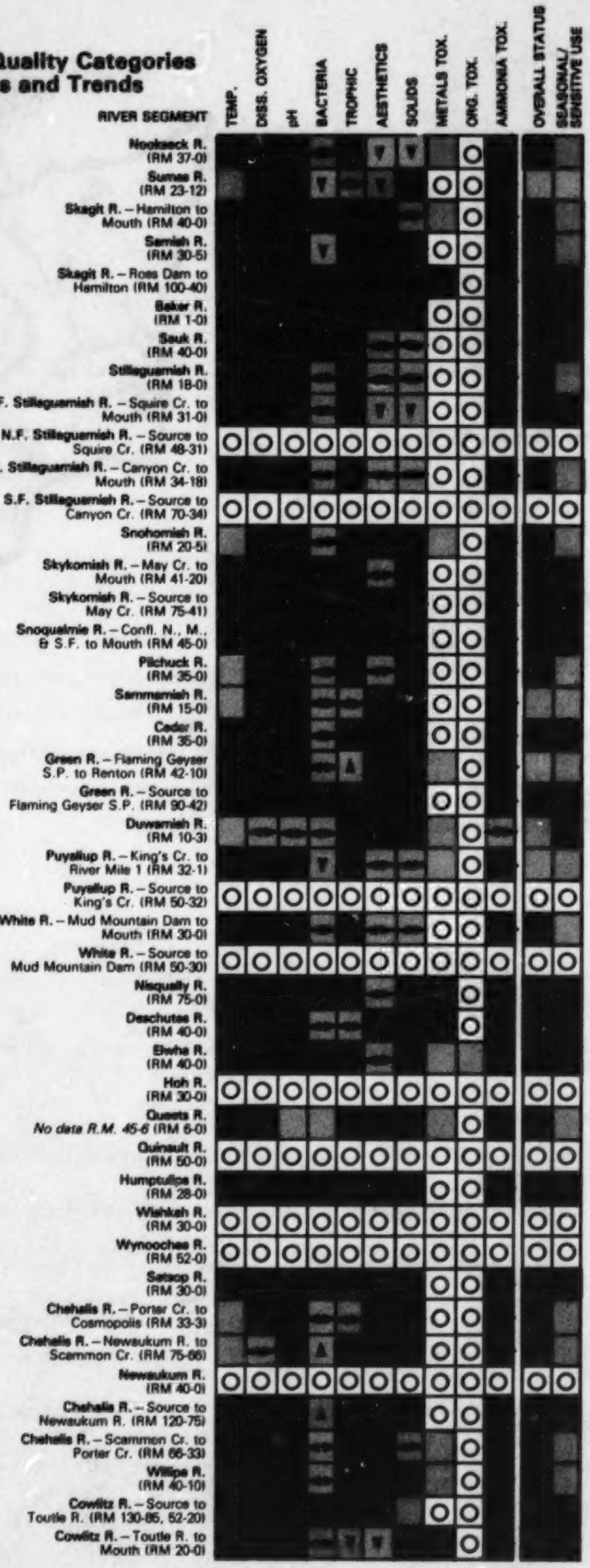
Metals Toxicity—Excess concentrations of heavy metals such as arsenic, cadmium, chromium, copper, lead, mercury and zinc are toxic to human, aquatic and other life forms.

Organic Toxicity—Excess concentrations of pesticides, herbicides, PCB's and other organic substances that are toxic to humans, mammals, birds, fish and other aquatic life forms.

Ammonia Toxicity—Excess concentrations of ammonia in its un-ionized form are toxic to fish and other aquatic life forms.

River Water Quality

Figure 16
Washington
River Water Quality Categories
Current Status and Trends



RIVER SEGMENT	TEMP.	DISS. OXYGEN	pH	BACTERIA	TROPHIC	AESTHETICS	SOLIDS	METALS TOX.	ORG. TOX.	AMMONIA TOX.	OVERALL STATUS	SEASONAL/ SENSITIVE USE
Nooksack R. (RM 37-0)						▼	▼		○			
Sumas R. (RM 23-12)				▼		▼		○	○			
Skagit R. – Hamilton to Mouth (RM 40-0)									○			
Samish R. (RM 30-5)				▼				○	○			
Skagit R. – Ross Dam to Hamilton (RM 100-40)									○			
Baker R. (RM 1-0)								○	○			
Sauk R. (RM 40-0)								○	○			
Stillaguamish R. (RM 18-0)								○	○			
N.F. Stillaguamish R. – Squire Cr. to Mouth (RM 31-0)						▼	▼	○	○			
N.F. Stillaguamish R. – Source to Squire Cr. (RM 48-31)	○	○	○	○	○	○	○	○	○	○	○	○
S.F. Stillaguamish R. – Canyon Cr. to Mouth (RM 34-18)								○	○			
S.F. Stillaguamish R. – Source to Canyon Cr. (RM 70-34)	○	○	○	○	○	○	○	○	○	○	○	○
Snohomish R. (RM 20-5)									○			
Skykomish R. – May Cr. to Mouth (RM 41-20)								○	○			
Skykomish R. – Source to May Cr. (RM 75-41)								○	○			
Snoqualmie R. – Confl. N., M., & S.F. to Mouth (RM 45-0)								○	○			
Pilchuck R. (RM 35-0)								○	○			
Sammamish R. (RM 15-0)								○	○			
Cedar R. (RM 35-0)								○	○			
Green R. – Flaming Geyser S.P. to Renton (RM 42-10)					▲				○			
Green R. – Source to Flaming Geyser S.P. (RM 90-42)								○	○			
Duwamish R. (RM 10-3)									○			
Puyallup R. – King's Cr. to River Mile 1 (RM 32-1)				▼					○			
Puyallup R. – Source to King's Cr. (RM 50-32)	○	○	○	○	○	○	○	○	○	○	○	○
White R. – Mud Mountain Dam to Mouth (RM 30-0)								○	○			
White R. – Source to Mud Mountain Dam (RM 50-30)	○	○	○	○	○	○	○	○	○	○	○	○
Nisqually R. (RM 75-0)									○			
Deschutes R. (RM 40-0)									○			
Elwha R. (RM 40-0)												
Hoh R. (RM 30-0)	○	○	○	○	○	○	○	○	○	○	○	○
Queets R. *No data R.M. 45-6* (RM 6-0)									○			
Quinault R. (RM 50-0)	○	○	○	○	○	○	○	○	○	○	○	○
Humptulips R. (RM 28-0)								○	○			
Wishkah R. (RM 30-0)	○	○	○	○	○	○	○	○	○	○	○	○
Wynoochee R. (RM 52-0)	○	○	○	○	○	○	○	○	○	○	○	○
Satsop R. (RM 30-0)								○	○			
Chehalis R. – Porter Cr. to Cosmopolis (RM 33-3)								○	○			
Chehalis R. – Newaukum R. to Scammon Cr. (RM 75-66)				▲				○	○			
Newaukum R. (RM 40-0)	○	○	○	○	○	○	○	○	○	○	○	○
Chehalis R. – Source to Newaukum R. (RM 120-75)				▲				○	○			
Chehalis R. – Scammon Cr. to Porter Cr. (RM 66-33)									○			
Willapa R. (RM 40-10)									○			
Cowlitz R. – Source to Toutle R. (RM 130-86, 52-20)								○	○			
Cowlitz R. – Toutle R. to Mouth (RM 20-0)					▼	▼			○			

▬ NO CHANGE/NOT SIGNIFICANT
▼ DETERIORATING
▲ IMPROVING

■ BENEFICIAL USE PROTECTED
▩ BENEFICIAL USE GENERALLY ATTAINED
▨ BENEFICIAL USE THREATENED
■ BENEFICIAL USE IMPAIRED
○ NO DATA

Based upon the Seasonal/Sensitive Use status during the Water Year 1980-82 period.

River Water Quality

Figure 18

Washington River Water Quality Categories Current Status and Trends

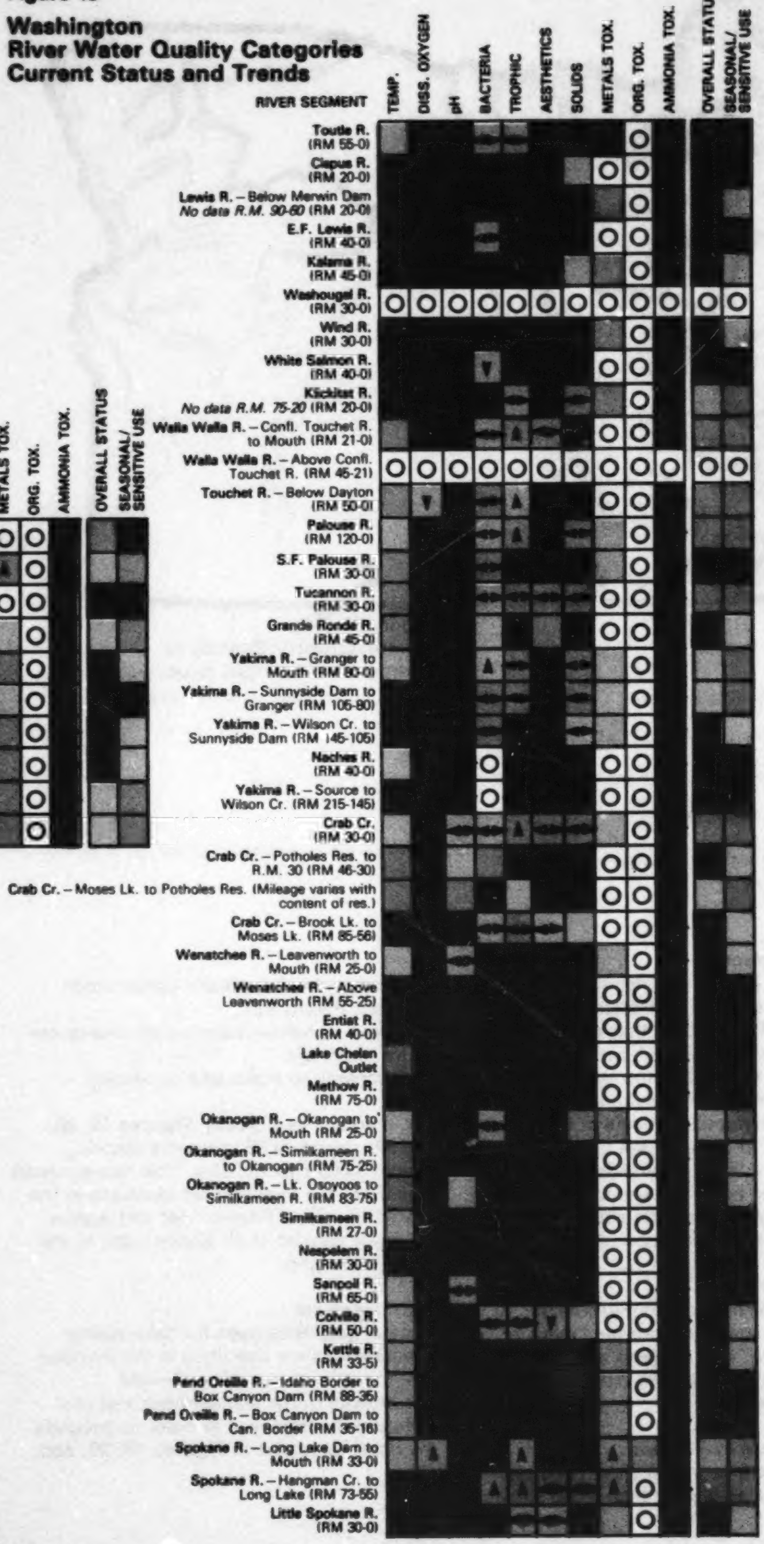
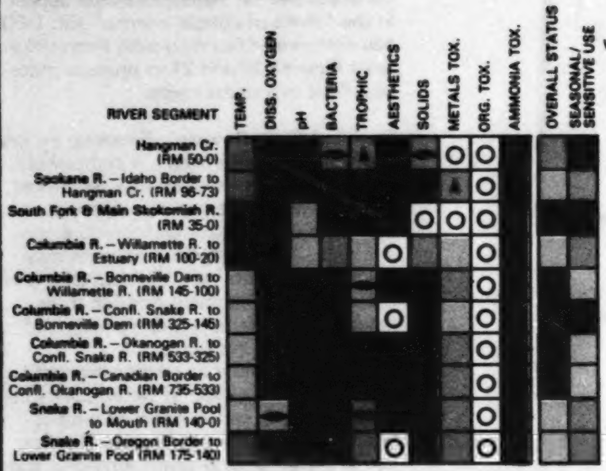


Figure 17

Washington River Water Quality Categories Current Status and Trends



- ⬌ NO CHANGE/NOT SIGNIFICANT
- ▼ DETERIORATING
- ▲ IMPROVING

- ■ BENEFICIAL USE PROTECTED
- ▨ BENEFICIAL USE GENERALLY ATTAINED
- ▩ BENEFICIAL USE THREATENED
- ■ BENEFICIAL USE IMPAIRED
- ○ NO DATA

Based upon the Seasonal/Sensitive Use status during the Water Year 1980-82 period.

River Water Quality

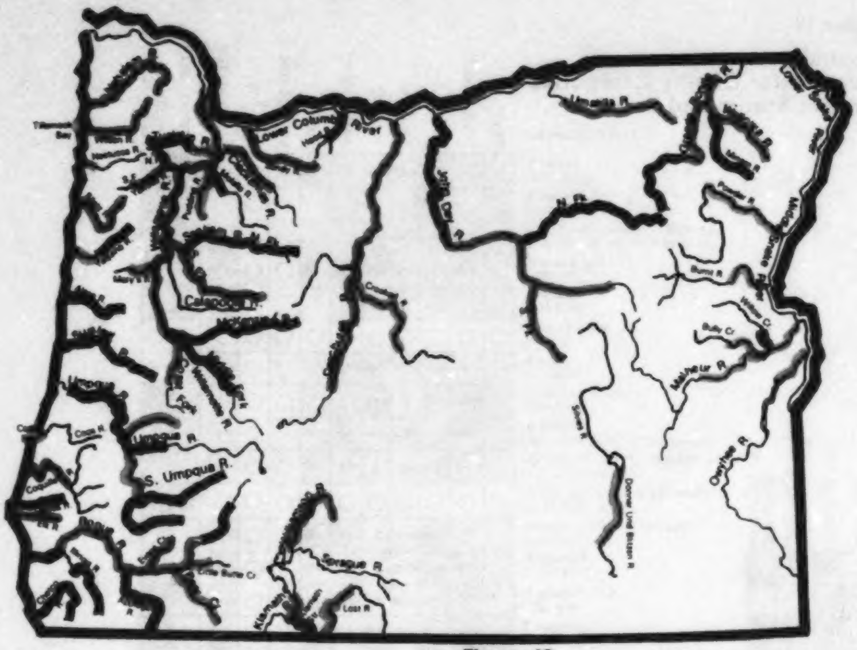


Figure 19
Water Quality Status of Oregon's Principal Rivers
(Based on the most sensitive beneficial use)

- ■ BENEFICIAL USE PROTECTED
- ■ BENEFICIAL USE GENERALLY ATTAINED
- ■ BENEFICIAL USE THREATENED
- ■ BENEFICIAL USE IMPAIRED
- ■ BENEFICIAL USE THREATENED OR IMPAIRED DUE TO NATURAL CAUSES OR PARAMETER GROUP NOT SIGNIFICANT IN THE EVALUATION OF SEGMENT USES
- ☐ NO DATA

Segment Selection
The State of Oregon has nearly 90,000 miles of rivers and streams contained within 19 river basins. Recognizing that constrained resources prohibit effective assessment of every stream mile within the state, the Oregon Department of Environmental Quality (DEQ) has developed a "rivers of special interest" list. At present, the primary purpose of the list is to provide a foundation for conducting beneficial use evaluations, for directing monitoring efforts and for reporting the status of water pollution control strategies.

Segments which appear in **Figures 19, 20** and **21** were extracted from the "rivers of special interest" list. Streams are included in this list if they meet one or more of the following criteria:

- Represents a major basin.
- Average flow is greater than 1,000 cfs.
- Drains an area greater than 1,000 square miles.
- Described in the state's Construction Grant Priority List.
- Above or below major urban area or major discharge.
- Discharge to major lake or estuary.

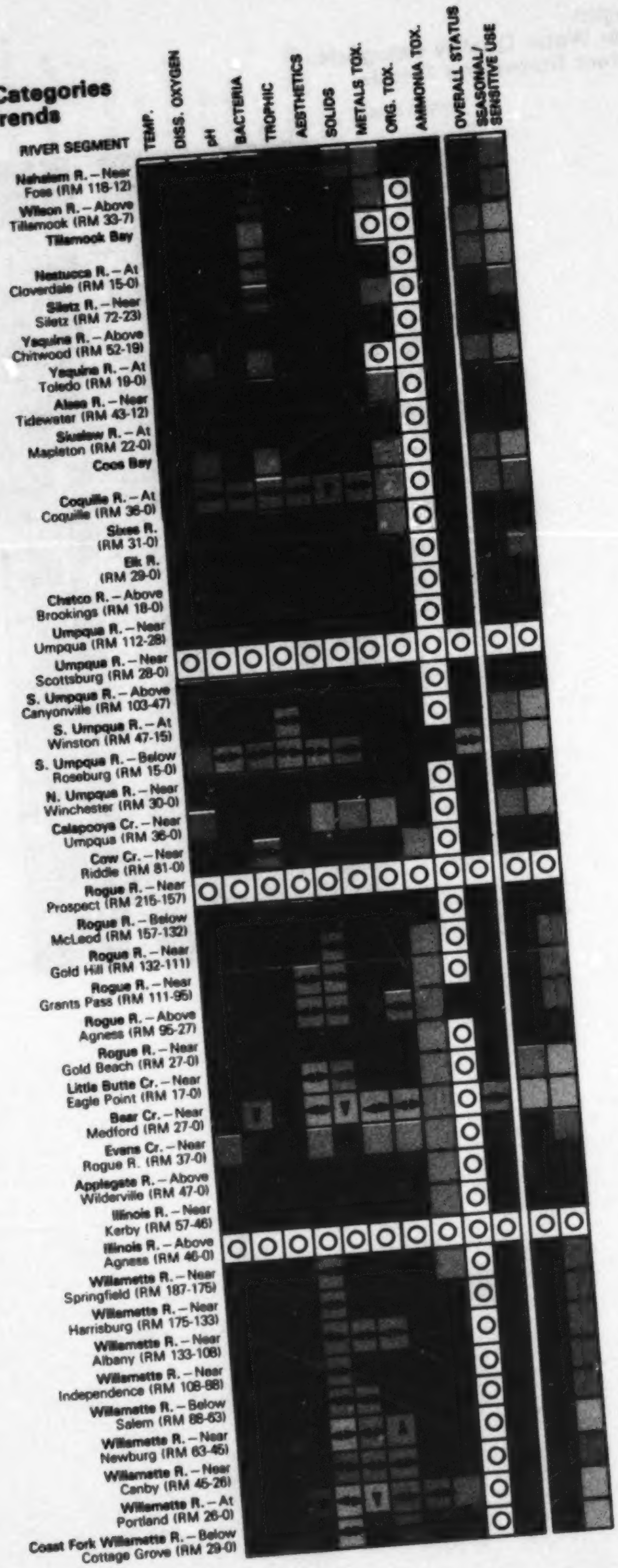
The map and box charts (**Figures 19, 20,** and **21**) represent 89 segments covering almost 3,500 stream miles. This represents 50 percent of the stream miles identified in the "rivers of special interest" list and approximately 4 percent of all stream miles in the State of Oregon.

Data Analysis
General guidelines used for determining stream status are described in the introduction to river water quality. Several refinements to the standard regional procedure were employed in order to integrate the data summaries in **Figures 19, 20,** and **21** with state reporting activities. Included in this process were:

- **Parametric Screening**—The primary purpose of this task was to isolate geographic areas and chemical constituents which would require a more detailed analysis. The Water Quality Index (WQI) developed by Region 10 was used as a tool to group segments into general status categories.
- **Beneficial Use Evaluation**—A Beneficial Use Index rating developed by Oregon DEQ was used extensively for the determination of segment status. This rating describes the season and level of each beneficial use for segments which appear in the "rivers of special interest" list. DEQ has combined this rating with information from **Figures 20** and **21** to produce state beneficial use status maps.
- **Detailed Data Review**—Focusing on key segments and parameters, a comprehensive technical assessment was performed. Included were: 1) a graphic review of statistical distributions for individual constituents, 2) an analysis of impacts from point sources and from characteristic land use around the segment through mass balance analyses, 3) a graphic review of hydrographs to highlight streamflow/parametric relationships and 4) a refined evaluation of water quality interactions such as the effect of nitrification on dissolved oxygen levels. Nitrification is the process in which ammonia and organic nitrogen are oxidized to nitrite, then to nitrate which requires oxygen.
- **Trends**—Water quality trends for Oregon rivers and streams were determined using a combination of analytical tools. Time series displays of raw and deseasonalized ambient monitoring data collected during the water year 1976-1982 period were generated. A nonparametric statistical test (SEN) was also calculated to determine trend significance. In addition, a regression analysis was performed in order to compare precision and accuracy of parametric measurements with observed values.

River Water Quality

Figure 20
Oregon
River Water Quality Categories
Current Status and Trends



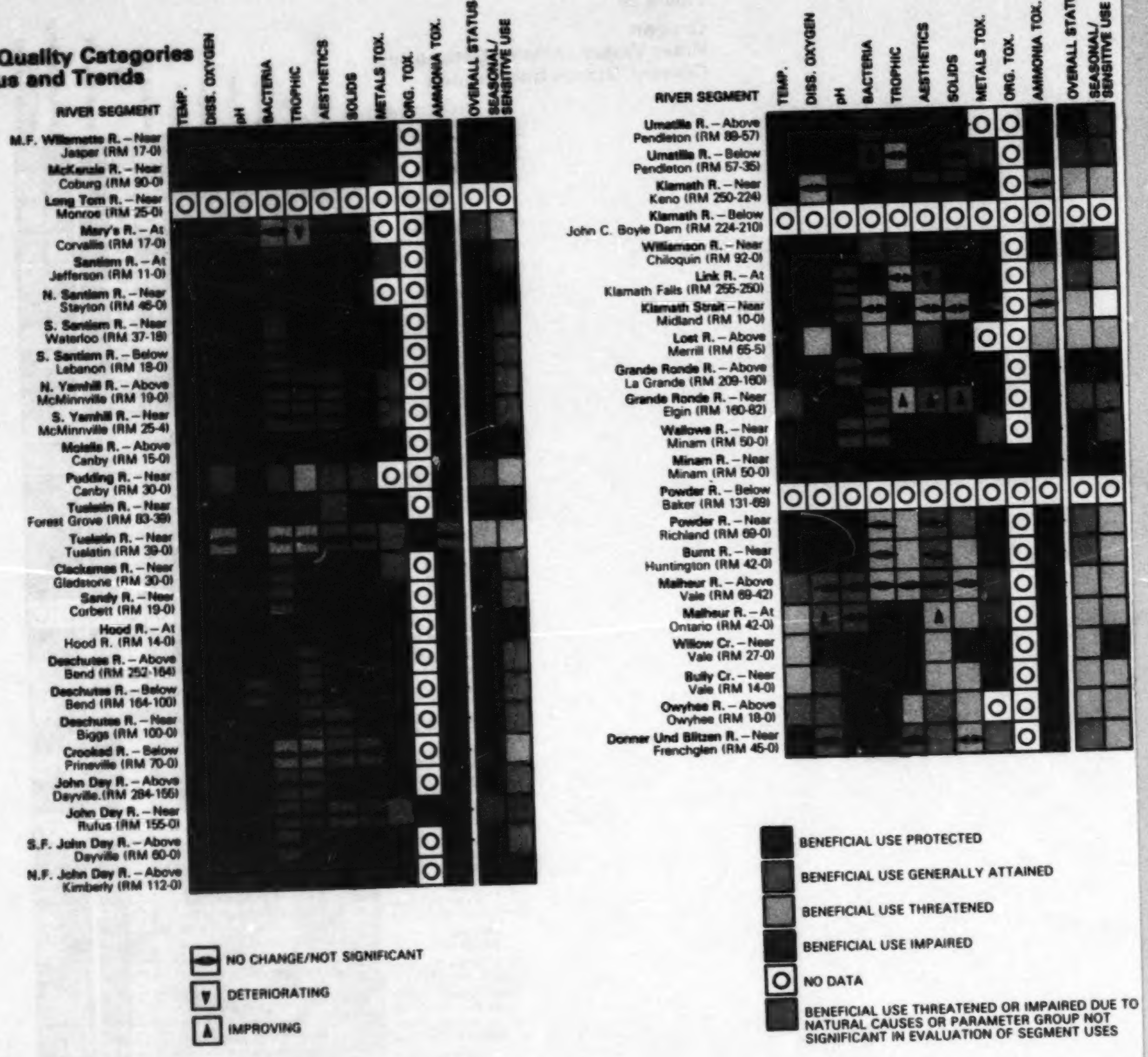
⬌	NO CHANGE/NOT SIGNIFICANT
▼	DETERIORATING
▲	IMPROVING
■	BENEFICIAL USE PROTECTED
▩	BENEFICIAL USE GENERALLY ATTAINED
▨	BENEFICIAL USE THREATENED
◎	NO DATA

Based upon the Seasonal/Sensitive Use status during the Water Year 1980-82 period.

River Water Quality

Figure 21

Oregon
River Water Quality Categories
Current Status and Trends



Based upon the Seasonal/Sensitive Use status during the Water Year 1980-82 period.

River Water Quality

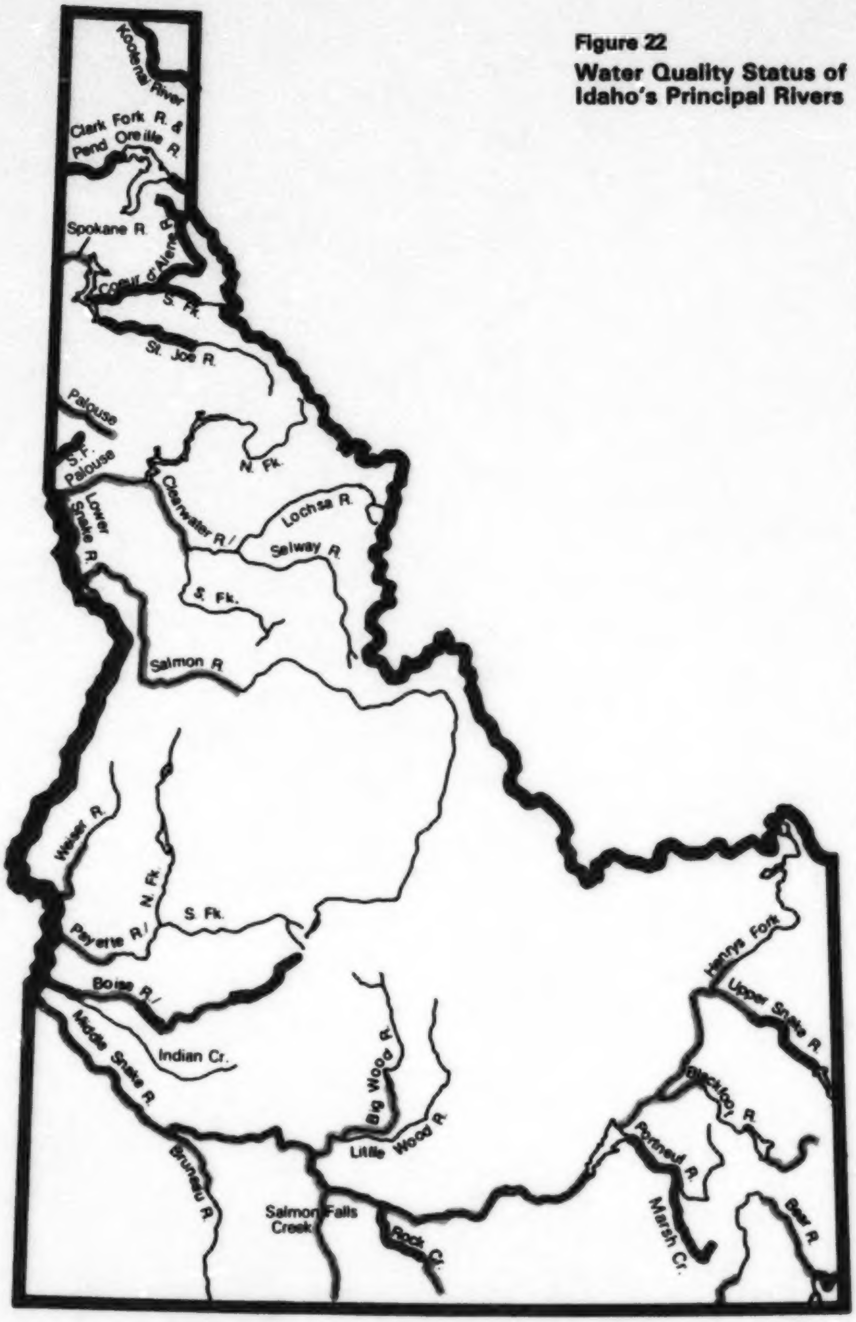

Kootenai River
Clark Fork R. &
Pend Oreille R.
Spokane R.
Coeur d'Alene R.
S. Fk.
St. Joe R.
Palouse
S.F. Palouse
Lower Snake R.
N. Fk.
Clearwater R./
Lochsa R.
Selway R.
S. Fk.
Salmon R.
Weiser R.
N. Fk.
S. Fk.
Payette R./
Boise R./
Middle Snake R.
Indian Cr.
Big Wood R.
Little Wood R.
Bruneau R.
Salmon Falls Creek
Rock Cr.
Henrys Fork
Upper Snake R.
Blackfoot R.
Portneuf R.
Marsh Cr.
Bear R.

Figure 22
Water Quality Status of Idaho's Principal Rivers

BASED UPON THE MOST SENSITIVE BENEFICIAL USE

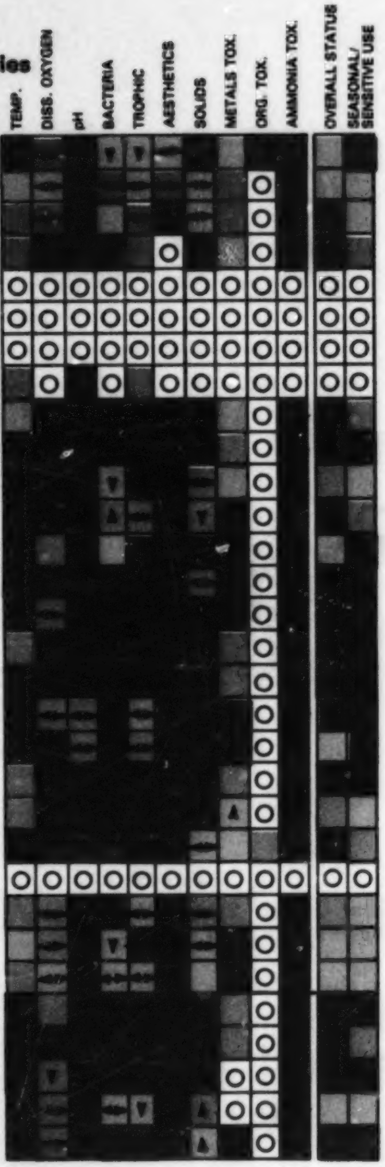
- ■ BENEFICIAL USE PROTECTED
- ■ BENEFICIAL USE GENERALLY ATTAINED
- ■ BENEFICIAL USE THREATENED
- ■ BENEFICIAL USE IMPAIRED
- □ NO DATA

Preceding page blank

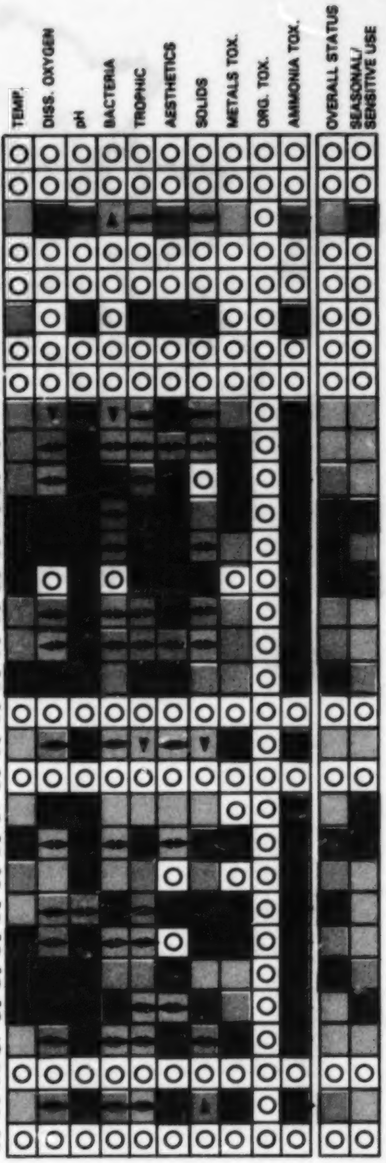
River Water Quality

Figure 23

Idaho River Water Quality Categories Current Status and Trends



RIVER SEGMENT	TEMP.	DISS. OXYGEN	pH	BACTERIA	TROPHIC	AESTHETICS	SOLIDS	METALS TOX.	ORG. TOX.	AMMONIA TOX.	OVERALL STATUS	SEASONAL/ SENSITIVE USE
Bear R. – Wyoming Border to Bear Lake Canal (RM 275-220)				▼	▼							
Bear R. – Bear Lake Canal Confl. to Soda Springs (RM 220-175)									○			
Bear R. – Mink Cr. to Utah Border (RM 120-95)									○			
Snake R. – Salmon R. Confl. to L. Granite Pool (RM 188-145)						○			○			
Selway R. – Source to Mouth (RM 95-0)	○	○	○	○	○	○	○	○	○	○	○	○
Lochsa R. – Source to Mouth (RM 80-0)	○	○	○	○	○	○	○	○	○	○	○	○
M.F. Clearwater R. (RM 98-75)	○	○	○	○	○	○	○	○	○	○	○	○
S.F. Clearwater R. (RM 62-0)		○		○		○	○	○	○	○	○	○
Clearwater R. – S.F. Confl. to N.F. Confl. (RM 75-40)									○			
N.F. Clearwater R. – Below Dworshak Dam (RM 2-0)									○			
Clearwater R. – N.F. Confl. to Slack Water (RM 40-5)				▼					○			
Palouse R. – Princeton to Washington Border (RM 150-120)				▲			▼		○			
S.F. Palouse R. (RM 50-30)									○			
Kootenai R. (RM 172-105)									○			
Clark Fork R. (RM 150-139)									○			
Pend Oreille R. (RM 120-88)									○			
Coeur d'Alene R. – Source to S.F. Confl. (RM 236-168)									○			
S.F. Coeur d'Alene R. – Wallace to Mouth (RM 20-0)									○			
Coeur d'Alene R. – S.F. Confl. to Mouth (RM 168-130)									○			
St. Joe R. – Calder to Mouth (RM 42-0)									○			
Spokane R. (RM 110-96)								▲	○			
Salmon R. – Below S.F. Salmon R. (RM 134-0)												
Salmon R. – Above S.F. Salmon R. (RM 400-134)	○	○	○	○	○	○	○	○	○	○	○	○
Snake R. – Buhl to Strike Res. (RM 595-490)									○			
Bruneau R. – Hot Springs to Mouth (RM 20-0)				▼					○			
Snake R. – Strike Dam to Boise R. (RM 490-390)									○			
M.F. Boise R. – Source to Mouth (RM 135-97)									○			
Boise R. – Confl. N.F. to Lucky Peak Dam (RM 97-63)									○			
Boise R. – Lucky Peak Dam to Boise (RM 63-50)		▼						○	○			
Boise R. – Boise to Caldwell (RM 50-22)					▼		▲	○	○			
Boise R. – Caldwell to Mouth (RM 22-0)							▲		○			



RIVER SEGMENT	TEMP.	DISS. OXYGEN	pH	BACTERIA	TROPHIC	AESTHETICS	SOLIDS	METALS TOX.	ORG. TOX.	AMMONIA TOX.	OVERALL STATUS	SEASONAL/ SENSITIVE USE
Indian Cr. – Above Nampa (RM 25-10)	○	○	○	○	○	○	○	○	○	○	○	○
Indian Cr. – Below Nampa (RM 10-0)	○	○	○	○	○	○	○	○	○	○	○	○
Snake R. – Boise R. to Brownlee Dam (RM 390-285)				▲					○			
S.F. Payette R. – Source to Mouth (RM 135-73)	○	○	○	○	○	○	○	○	○	○	○	○
N.F. Payette R. – Source to McCall (RM 93-75)	○	○	○	○	○	○	○	○	○	○	○	○
N.F. Payette R. – McCall to Cascade Dam (RM 75-40)		○		○				○	○		○	○
N.F. Payette R. – Cascade Dam to Mouth (RM 40-0)	○	○	○	○	○	○	○	○	○	○	○	○
Payette R. – S.F./N.F. Confl. to Black Canyon Dam (RM 73-40)	○	○	○	○	○	○	○	○	○	○	○	○
Payette R. – Black Canyon Dam to Mouth (RM 40-0)		▼		▼					○			
Weiser R. – Midvale to Mouth (RM 35-0)									○			
Snake R. – Hells Canyon Dam to Salmon R. Confl. (RM 247-188)							○		○			
Snake R. – Wyo. Border to Heise (RM 900-850)									○			
Snake R. – Heise to Roberts (RM 850-815)									○			
Henry's Fork – Source to Island Park Res. (RM 117-92)		○		○				○	○			
Henry's Fork – Island Park Dam to Mouth (RM 92-0)									○			
Snake R. – Roberts to American Falls Res. (RM 815-715)									○			
Blackfoot R. – Source to Blackfoot Res. (RM 150-85)									○			
Blackfoot R. – Blackfoot Res. to Equalizing Res. (RM 85-16)	○	○	○	○	○	○	○	○	○	○	○	○
Blackfoot R. – Equalizing Res. to Mouth (RM 16-0)					▼		▼		○			
Portneuf R. – Source to Marsh Cr. (RM 50-33)	○	○	○	○	○	○	○	○	○	○	○	○
Marsh Cr. (RM 50-0)								○	○			
Portneuf R. – Marsh Cr. to Mouth (RM 33-0)									○			
Snake R. – American Falls Dam to Minidoka Dam (RM 715-675)						○		○	○			
Snake R. – Minidoka Dam to Burley/Heyburn Br. (RM 675-652)									○			
Snake R. – Burley/Heyburn Br. to Buhl (RM 652-580)						○			○			
Rock Cr. – Source to Rock Creek (town) (RM 50-30)									○			
Rock Cr. – Rock Creek (town) to Mouth (RM 30-0)									○			
Salmon Falls Cr. (RM 45-0)									○			
Big Wood R. – Source to Magic Res. (RM 96-60)	○	○	○	○	○	○	○	○	○	○	○	○
Big Wood R./Malad R. – Magic Dam to Mouth (RM 60-0)							▲		○			
Little Wood R. – Source to Mouth (RM 90-0)	○	○	○	○	○	○	○	○	○	○	○	○

— NO CHANGE/NOT SIGNIFICANT

▼ DETERIORATING

▲ IMPROVING

■ BENEFICIAL USE PROTECTED

▩ BENEFICIAL USE GENERALLY ATTAINED

▨ BENEFICIAL USE THREATENED

▦ BENEFICIAL USE IMPAIRED

○ NO DATA

Based upon the Seasonal/Sensitive Use status during the Water Year 1980-82 period.

The Water Quality Index (WQI) developed by Region 10 was used as the major input for the determination of river segment status in Idaho. State standards were used in the WQI calculations where appropriate in lieu of Federal criteria. The box charts (Figure 23) represent 62 segments covering approximately 3,020 stream miles. The overall status for 16 of the segments could not be determined due to the lack of sufficient water quality information.

River Water Quality

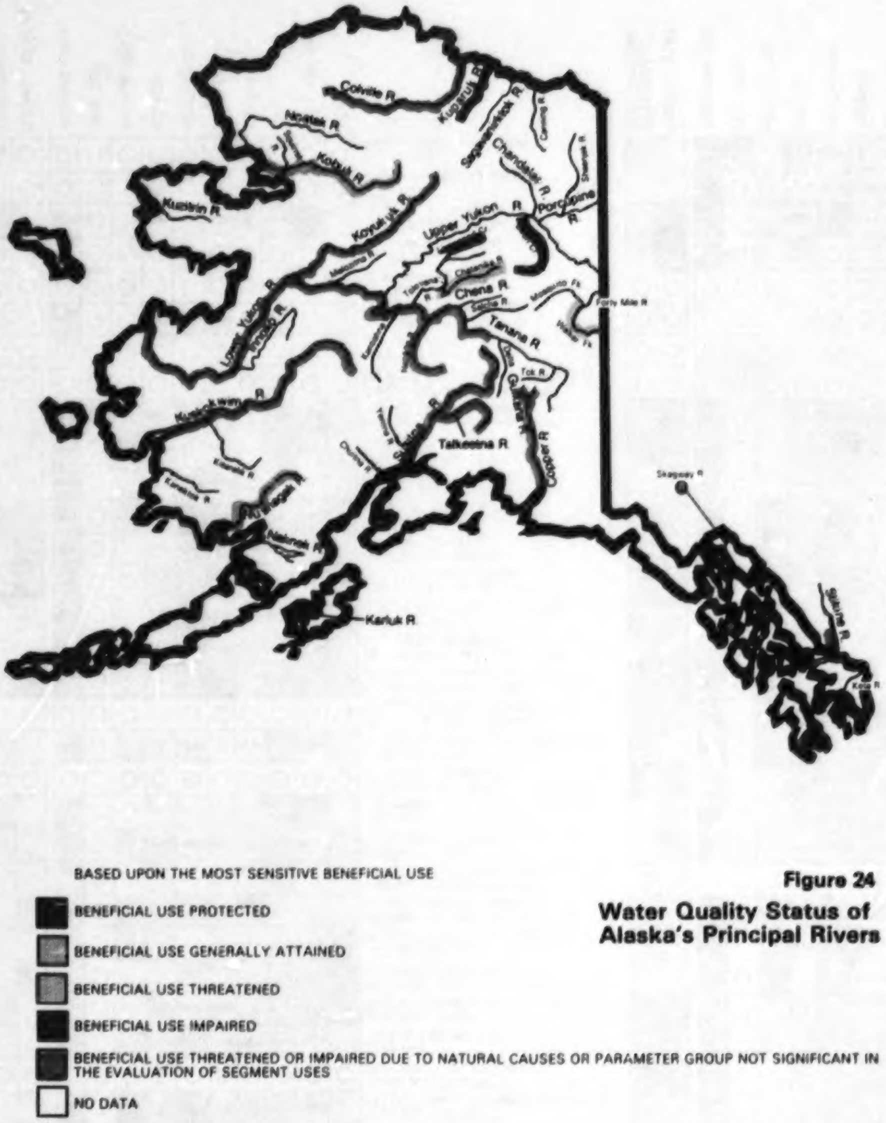
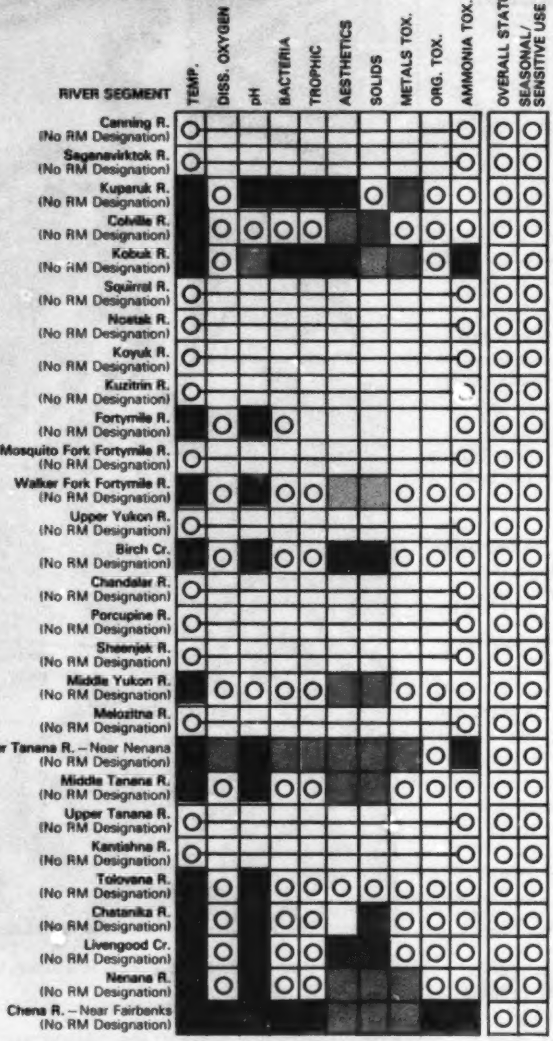

Colville R
Kuparuk R
Sagavanirktok R
Canning R
Sheenjek R
Chandalar R
Porcupine R
Noatak R
Kobuk R
Kuzitrin R
Koyukuk R
Upper Yukon R
Melozitna R
Chatanika R
Tolovana R
Chena R
Salcha R
Mosquito Fk
Forty Mile R
Walker Fk
Tanana R
Delta R
Gulkana R
Tok R
Lower Yukon R
Innoko R
Kantishna R
Nenana R
Kuskokwim R
Talkeetna R
Yentna R
Susitna R
Chulitna R
Kisaralik R
Kanektok R
Nushagak R
Naknek R
Karluk R
Copper R
Skagway R
Stikine R
Kete R
BASED UPON THE MOST SENSITIVE BENEFICIAL USE
BENEFICIAL USE PROTECTED
BENEFICIAL USE GENERALLY ATTAINED
BENEFICIAL USE THREATENED
BENEFICIAL USE IMPAIRED
BENEFICIAL USE THREATENED OR IMPAIRED DUE TO NATURAL CAUSES OR PARAMETER GROUP NOT SIGNIFICANT IN THE EVALUATION OF SEGMENT USES
NO DATA

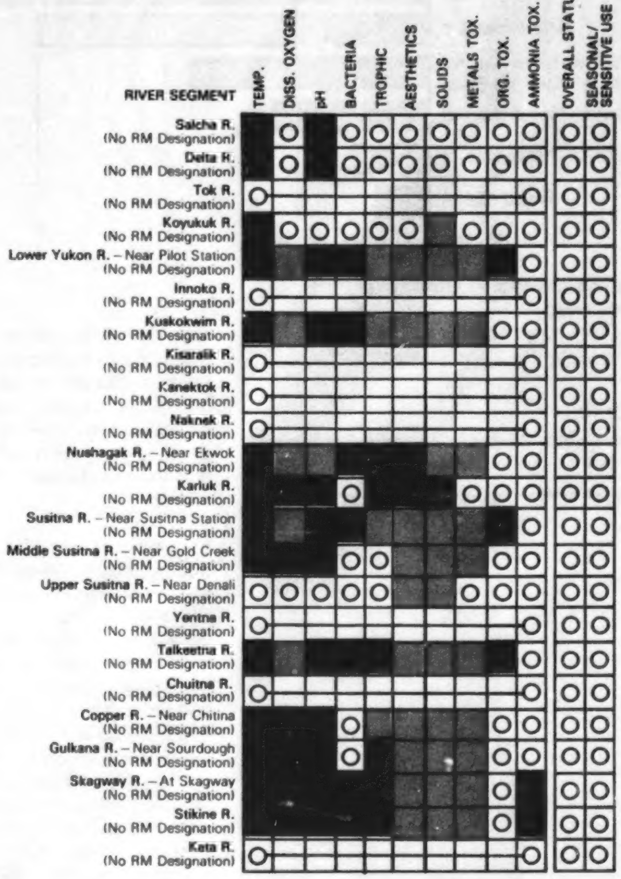
Figure 24
Water Quality Status of Alaska's Principal Rivers

River Water Quality

Figure 25
Alaska
River Water Quality Categories
Current Status and Trends



RIVER SEGMENT	TEMP.	DISS. OXYGEN	pH	BACTERIA	TROPHIC	AESTHETICS	SOLIDS	METALS TOX.	ORG. TOX.	AMMONIA TOX.	OVERALL STATUS	SEASONAL/ SENSITIVE USE
Canning R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Sagavanirktok R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Kuparuk R. (No RM Designation)	■	○	■	■	■	■	○	▨	○	○	○	○
Colville R. (No RM Designation)	■	○	○	○	○	▨	■	○	○	○	○	○
Kobuk R. (No RM Designation)	■	○	▨	■	■	■	▨	▨	○	■	○	○
Squirrel R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Noatak R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Koyuk R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Kuzitrin R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Fortymile R. (No RM Designation)	■	○	■	○	□	□	□	□	□	○	○	○
Mosquito Fork Fortymile R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Walker Fork Fortymile R. (No RM Designation)	■	○	■	○	○	▨	▨	○	○	○	○	○
Upper Yukon R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Birch Cr. (No RM Designation)	■	○	■	○	○	■	■	○	○	○	○	○
Chandalar R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Porcupine R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Sheenjek R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Middle Yukon R. (No RM Designation)	■	○	○	○	○	▨	▨	○	○	○	○	○
Melozitna R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Lower Tanana R. – Near Nenana (No RM Designation)	■	▨	■	▨	▨	▨	▨	▨	○	■	○	○
Middle Tanana R. (No RM Designation)	■	○	■	○	○	▨	▨	○	○	○	○	○
Upper Tanana R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Kantishna R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Tolovana R. (No RM Designation)	■	○	■	○	○	○	○	○	○	○	○	○
Chatanika R. (No RM Designation)	■	○	■	○	○	□	■	○	○	○	○	○
Livengood Cr. (No RM Designation)	■	○	■	○	○	■	■	○	○	○	○	○
Nenana R. (No RM Designation)	■	○	■	○	○	▨	▨	▨	○	○	○	○
Chena R. – Near Fairbanks (No RM Designation)	■	■	■	■	■	▨	▨	▨	■	■	○	○



RIVER SEGMENT	TEMP.	DISS. OXYGEN	pH	BACTERIA	TROPHIC	AESTHETICS	SOLIDS	METALS TOX.	ORG. TOX.	AMMONIA TOX.	OVERALL STATUS	SEASONAL/ SENSITIVE USE
Salcha R. (No RM Designation)	■	○	■	○	○	○	○	○	○	○	○	○
Delta R. (No RM Designation)	■	○	■	○	○	○	○	○	○	○	○	○
Tok R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Koyukuk R. (No RM Designation)	■	○	○	○	○	○	▨	○	○	○	○	○
Lower Yukon R. – Near Pilot Station (No RM Designation)	■	▨	■	■	▨	▨	▨	▨	■	○	○	○
Innoko R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Kuskokwim R. (No RM Designation)	■	▨	■	■	▨	▨	▨	▨	○	○	○	○
Kisaralik R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Kanektok R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Naknek R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Nushagak R. – Near Ekwok (No RM Designation)	■	▨	▨	■	■	■	▨	▨	○	○	○	○
Karluk R. (No RM Designation)	■	■	■	○	■	■	■	○	○	○	○	○
Susitna R. – Near Susitna Station (No RM Designation)	■	▨	■	■	▨	▨	▨	▨	■	○	○	○
Middle Susitna R. – Near Gold Creek (No RM Designation)	■	■	■	○	○	▨	▨	▨	○	○	○	○
Upper Susitna R. – Near Denali (No RM Designation)	○	○	○	○	○	▨	▨	○	○	○	○	○
Yentna R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Talkeetna R. (No RM Designation)	■	▨	■	■	■	▨	▨	▨	■	○	○	○
Chuitna R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○
Copper R. – Near Chitina (No RM Designation)	■	■	■	○	▨	▨	▨	▨	○	○	○	○
Gulkana R. – Near Sourdough (No RM Designation)	■	■	■	○	■	▨	▨	▨	○	○	○	○
Skagway R. – At Skagway (No RM Designation)	■	■	■	■	■	▨	▨	▨	○	■	○	○
Stikine R. (No RM Designation)	■	■	■	■	■	▨	▨	▨	○	■	○	○
Kata R. (No RM Designation)	○	—	—	—	—	—	—	—	—	○	○	○

- □ BENEFICIAL USE PROTECTED
- ▩ BENEFICIAL USE GENERALLY ATTAINED
- ▒ BENEFICIAL USE THREATENED
- ■ BENEFICIAL USE IMPAIRED
- ○ NO DATA
- ▨ BENEFICIAL USE THREATENED OR IMPAIRED DUE TO NATURAL CAUSES OR PARAMETER GROUP NOT SIGNIFICANT IN EVALUATION OF SEGMENT USES

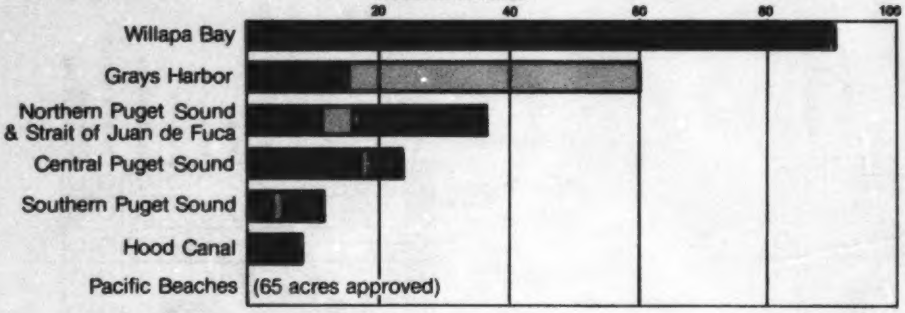
Based upon the Seasonal/Sensitive Use status during the Water Year 1980-82 period.

Figure 25 displays the status and trends of Alaska's water quality. Because most of Alaska is remote and inaccessible, water quality information is scattered, as well as difficult and expensive to obtain. Therefore, many of the state's principal streams cannot be evaluated.

Many river stations exceed recommended Federal guideline criteria for solids, aesthetics, and metals on an intermittent basis. Most of these high levels are due to natural causes, such as ice breakup or runoff from snowpack and glaciers. This also holds true for low dissolved oxygen levels in the winter months resulting from ice cover. Consequently, an attempt was made to separate these phenomena from human impacts, such as placer mining, through the use of the color gray in the matrix box.

Marine Water Quality

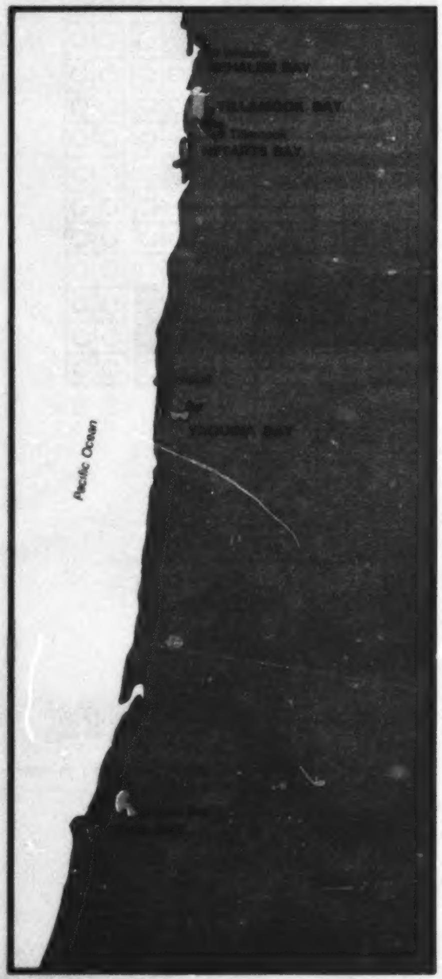
Figure 27
Status of Classified Shellfish Areas in Washington



How Marine Water Quality is Determined

The direct measurement of the quality of marine waters is a complex and expensive task. Shellfish such as oysters, clams and mussels can concentrate disease causing bacteria and viruses as well as certain toxic chemicals, radionuclides and biotoxins. Consequently, shellfish can be used as practical long-term indicators of water quality and the effectiveness of pollution control efforts.

Figure 28
Water Quality Map of Oregon's Commercial Shellfish Growing Areas


NEHALEM BAY
TILLAMOOK BAY
NETARTS BAY
YAQUINA BAY
Pacific Ocean

In this report, the discussion of marine water quality is based upon the criteria used to classify shellfish growing waters for the protection of the health of shellfish consumers. The criteria were established by state health agencies and the shellfish industry in consultation with the U. S. Food and Drug Administration under the National Shellfish Sanitation Program. Waters that are free from fecal contamination, industrial wastes, radioactive elements and biotoxins (certain naturally produced poisons) are classified as *"approved for commercial shellfish harvesting." "Conditionally approved"* waters may be closed when seasonal increases in population, freshwater runoff containing contaminants at certain times of the year, or temporary malfunctioning of wastewater treatment plants result in failure to meet the criteria. Waters found to be contaminated or suspected of being contaminated, which would produce shellfish unsafe for human consumption, are classified as *"closed"*.

Figure 29
Status of Classified Shellfish Growing Areas in Oregon

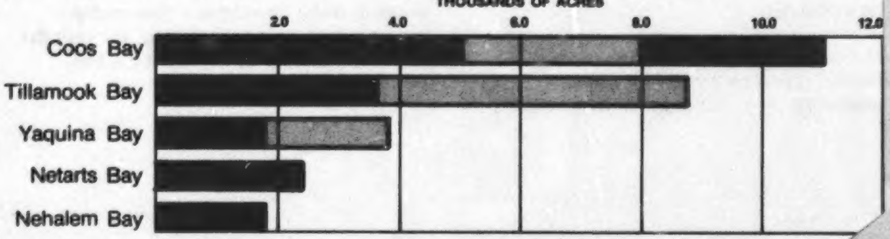
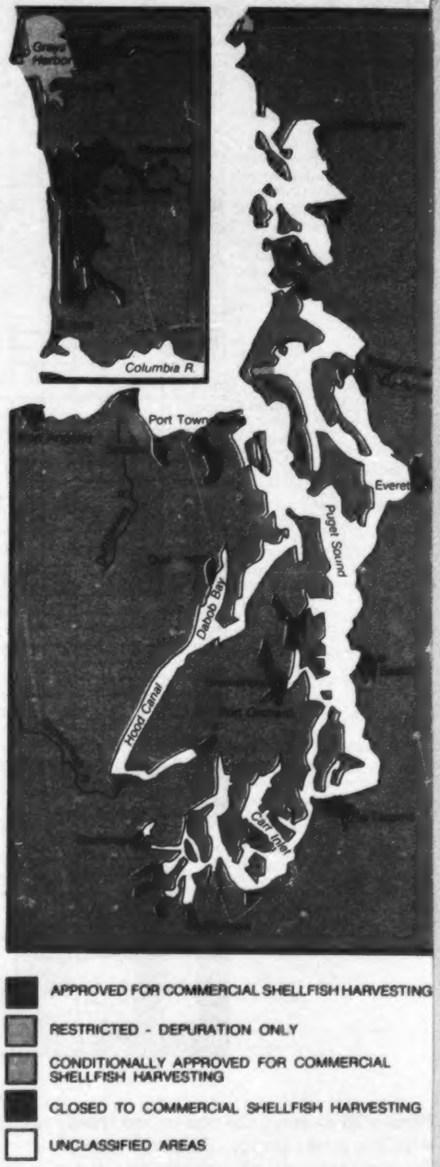
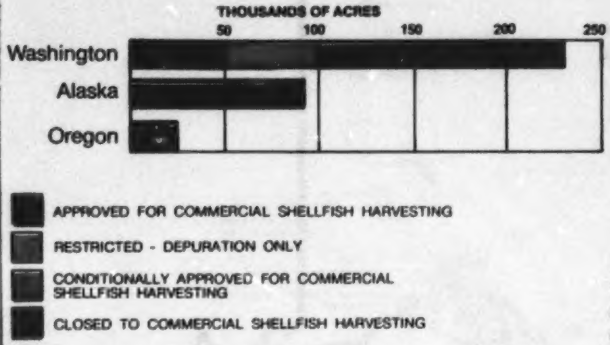


Figure 26
Water Quality Map of Washington's Classified Commercial Shellfish Growing Areas

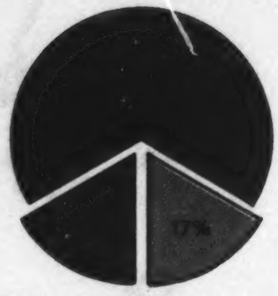

Grays Harbor
Columbia R.
Port Town
Everet
Puget Sound
Dabob Bay
Hood Canal
Carr Inlet
APPROVED FOR COMMERCIAL SHELLFISH HARVESTING
RESTRICTED - DEPURATION ONLY
CONDITIONALLY APPROVED FOR COMMERCIAL SHELLFISH HARVESTING
CLOSED TO COMMERCIAL SHELLFISH HARVESTING
UNCLASSIFIED AREAS

Marine Water Quality

Figure 30
Status of Classified Shellfish Growing Areas in Region 10



Note: Depuration is a process shellfish can be subjected to which reduces bacterial contamination to acceptable levels by utilizing their natural purification abilities. Commercially grown shellfish from this area must be so treated before they are harvested for sale to the public.



Regional Summary: Percentage of the Region's active shellfish areas that are open for harvesting.

Note: Less than one percent of the classified areas were considered "RESTRICTED—DEPURATION ONLY". These areas are placed under "CONDITIONALLY APPROVED" for the purposes of this pie chart.

The Regional Overview

Approximately 355,000 acres of commercial shellfish growing area have been classified in Region 10 (**Figure 30**). This represents about 2 percent of the classified growing area in the United States. Of the total classified acreage in Region 10, 66 percent is classified as approved, 17 percent is conditionally approved and 17 percent is closed.

Washington has the largest percentage of the total classified area (65 percent or 231,000 acres), followed by Alaska (27 percent or 96,4000 acres) and Oregon (8 percent or 28,073 acres).

Although most of the shellfish growing areas in Region 10 have been classified based on bacteriological water quality standards, there are several very important exceptions. For example, most of the urban and industrialized areas such as Commmencement Bay, Elliott Bay and Everett Harbor have been closed to commercial shellfishing for years. These closures were not necessarily based on known pollution problems. They were based simply on the health agency's recognition of the high potential for such problems in waters adjacent to residential, urban and industrial activities. Interestingly, it is some of these same areas that have more recently been found to be contaminated with a variety of potentially toxic organic and inorganic chemicals. These findings underscore the effectiveness and utility of the shellfish growing area classification system.

Alaska's Marine Waters

The Alaska State Department of Health and Social Services has classified approximately 96,400 acres of coastal shellfish growing waters. These waters are approved for the commercial harvest of razor clams upon the issuance of a harvest permit. As shown in **Figure 31**, the majority of the approved area is in the vicinity of Cordova.

The shellfish growing areas that remain unclassified are considered to be *"administratively closed"* only because they have not been surveyed or monitored for the presence of **paralytic shellfish poison (PSP).***

Washington's Marine Waters

Approximately 231,000 acres of shellfish growing area have been classified by the Washington State Department of Social and Health Services. Of this acreage, 58 percent is approved, 21 percent is conditionally approved and 21 percent is closed of the commercial harvest of shellfish.

The classification of the larger growing areas and major embayments is shown in **Figure 26**. A more detailed breakdown of the status of these areas is given in **Figure 27**. Most of the growing areas in Willapa Bay and Hood Canal are classified as approved. However, a significant portion of the areas in northern, central and southern Puget Sound remain closed or conditionally approved. All of Grays Harbor is classified as closed or conditionally approved.

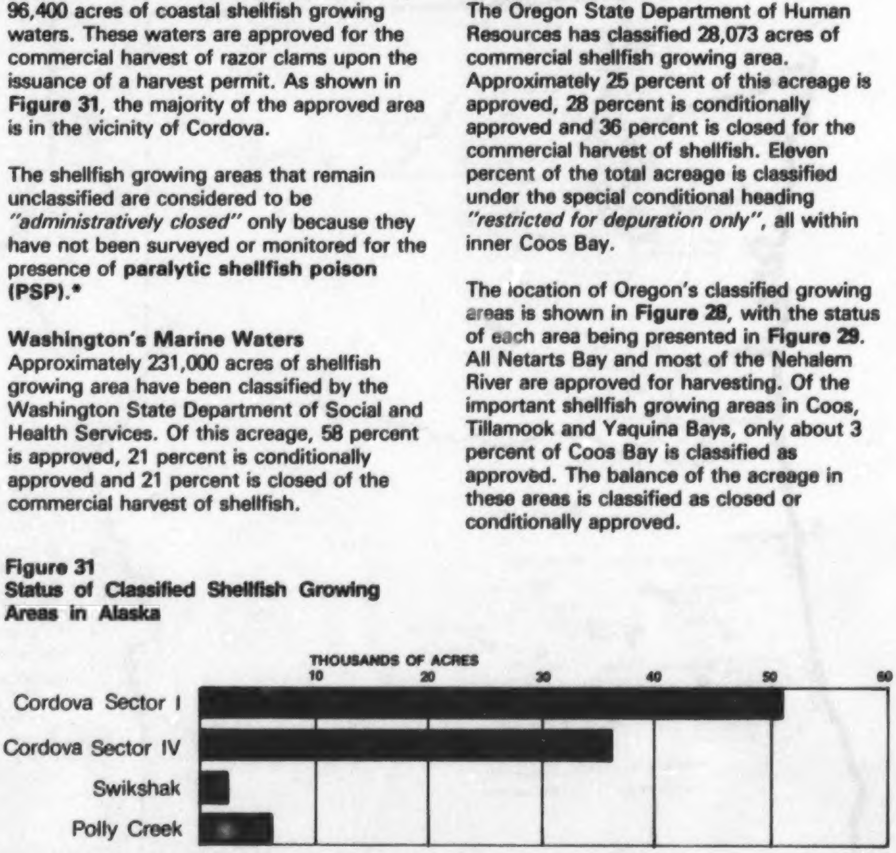
On occasion, shellfish harvesting in northern and central Puget Sound has to be restricted because of increased levels of paralytic shellfish poison.

Oregon's Marine Waters

The Oregon State Department of Human Resources has classified 28,073 acres of commercial shellfish growing area. Approximately 25 percent of this acreage is approved, 28 percent is conditionally approved and 36 percent is closed for the commercial harvest of shellfish. Eleven percent of the total acreage is classified under the special conditional heading *"restricted for depuration only"*, all within inner Coos Bay.

The location of Oregon's classified growing areas is shown in **Figure 28**, with the status of each area being presented in **Figure 29**. All Netarts Bay and most of the Nehalem River are approved for harvesting. Of the important shellfish growing areas in Coos, Tillamook and Yaquina Bays, only about 3 percent of Coos Bay is classified as approved. The balance of the acreage in these areas is classified as closed or conditionally approved.

Figure 31
Status of Classified Shellfish Growing Areas in Alaska



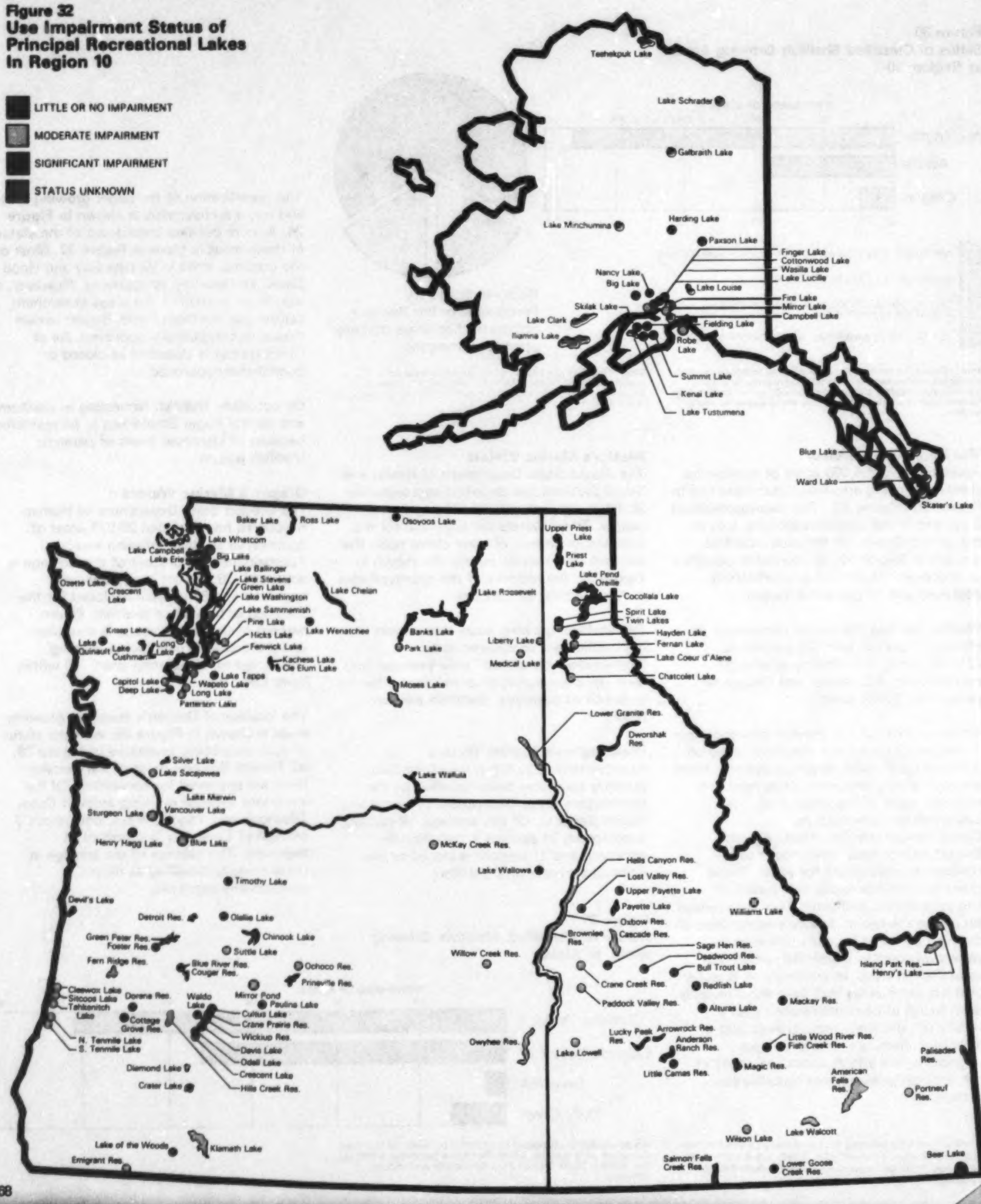
Areas depicted represent only those portions of the total estuarine and coastal areas that have been classified by the Alaska State Department of Health and Social Services.

---

* **PSP** is a naturally occurring toxin produced by a group of one-celled marine algae. Concentrated in oysters, clams and mussels, high levels of PSP can cause serious illness or death if consumed by humans.

Lake Water Quality

Figure 32
Use Impairment Status of Principal Recreational Lakes In Region 10


■ LITTLE OR NO IMPAIRMENT
■ MODERATE IMPAIRMENT
■ SIGNIFICANT IMPAIRMENT
■ STATUS UNKNOWN
Teshekpuk Lake
Lake Schrader
Galbraith Lake
Lake Minchumina
Harding Lake
Paxson Lake
Finger Lake
Cottonwood Lake
Wasilla Lake
Lake Lucille
Nancy Lake
Big Lake
Lake Louise
Skilak Lake
Fire Lake
Mirror Lake
Campbell Lake
Lake Clark
Fielding Lake
Iliamna Lake
Robe Lake
Summit Lake
Kenai Lake
Lake Tustumena
Blue Lake
Ward Lake
Skater's Lake
Baker Lake
Ross Lake
Osoyoos Lake
Lake Whatcom
Lake Campbell
Lake Erie
Big Lake
Lake Ballinger
Lake Stevens
Green Lake
Lake Washington
Lake Sammamish
Pine Lake
Hicks Lake
Fenwick Lake
Ozette Lake
Crescent Lake
Kitsap Lake
Lake Quinault
Lake Cushman
Long Lake
Lake Chelan
Lake Wenatchee
Kachess Lake
Cle Elum Lake
Lake Tapps
Capitol Lake
Deep Lake
Wapato Lake
Long Lake
Patterson Lake
Banks Lake
Park Lake
Moses Lake
Lake Roosevelt
Liberty Lake
Medical Lake
Upper Priest Lake
Priest Lake
Lake Pend Oreille
Cocolalla Lake
Spirit Lake
Twin Lakes
Hayden Lake
Fernan Lake
Lake Coeur d'Alene
Chatcolet Lake
Lower Granite Res.
Dworshak Res.
Silver Lake
Lake Sacajawea
Lake Wallula
Lake Merwin
Vancouver Lake
Sturgeon Lake
Henry Hagg Lake
Blue Lake
McKay Creek Res.
Lake Wallowa
Timothy Lake
Devil's Lake
Detroit Res.
Olallie Lake
Green Peter Res.
Foster Res.
Chinook Lake
Suttle Lake
Fern Ridge Res.
Blue River Res.
Cougar Res.
Ochoco Res.
Prineville Res.
Cleawox Lake
Siltcoos Lake
Tahkenitch Lake
Dorena Res.
Waldo Lake
Mirror Pond
Paulina Lake
Cottage Grove Res.
Cultus Lake
Crane Prairie Res.
Wickiup Res.
Davis Lake
Odell Lake
Crescent Lake
Hills Creek Res.
N. Tenmile Lake
S. Tenmile Lake
Diamond Lake
Crater Lake
Lake of the Woods
Klamath Lake
Emigrant Res.
Hells Canyon Res.
Lost Valley Res.
Upper Payette Lake
Payette Lake
Oxbow Res.
Cascade Res.
Brownlee Res.
Williams Lake
Willow Creek Res.
Sage Hen Res.
Deadwood Res.
Bull Trout Lake
Island Park Res.
Henry's Lake
Crane Creek Res.
Redfish Lake
Paddock Valley Res.
Alturas Lake
Mackay Res.
Owyhee Res.
Lucky Peak Res.
Arrowrock Res.
Anderson Ranch Res.
Little Wood River Res.
Fish Creek Res.
Lake Lowell
Palisades Res.
Magic Res.
Little Camas Res.
American Falls Res.
Portneuf Res.
Wilson Lake
Lake Walcott
Salmon Falls Creek Res.
Lower Goose Creek Res.
Bear Lake

ake Water Quality

ntroduction

he quality of the principal recreational lakes nd reservoirs in Region 10 is assessed by valuating their trophic status and degree of ecreational use impairment. These valuations are presented in **Figures 33** hrough **36** and were obtained by nterpretation of published reports, from rofessional judgments of water quality pecialists, and from water quality data vailable to EPA. Where sufficient water uality data were available, the impairment valuation criteria and rating scheme shown n **Table 3** was used.

he principal recreational lakes within the egion are of generally good quality, with elatively few impairments related to human ctivities. **Figure 32** shows the location and npairment status of each lake on a regional nap. Approximately half of the lakes ssessed in Oregon, Washington, and Idaho nd most of the Alaskan lakes for which here is information, have little or no ecreational impairment. However, some of hese lakes are approaching a level of utrophication that interferes with their esired uses.

The EPA Clean Lakes program has provided Federal grants to state and local water quality agencies to improve lake quality. Due to Federal budget cuts, however, this program is being phased out. In Washington, this program is supplemented by a state lake restoration program which provide matching funds to local agencies. Some measures being implemented to improve lake water quality include dredging to remove nutrient-containing sediments and decomposing plant material that consumes oxygen, flushing, bank erosion control, aeration, physically removing aquatic plants, and both chemical and biological control to prevent eutrophication. Through these programs, some of the high-use recreational lakes in the region are being restored and preserved for future generations.

Table 3
Criteria for Evaluating Impairment of Lakes

	DEGREE OF IMPAIRMENT	
RECREATIONAL USE	NONE	
	CRITERIA	SCORE
Swimming	Very low bacteria levels (Fecal coliforms geometric mean less than 50 per 100 ml)	■
Fishing	No adverse conditions. Healthy fish population.	■
Boating	Less than 10% of surface area affected by aquatic weeds	■
Aesthetics	Objects visible in water to depth of 10 feet or more and low phosphorus (Secchi Disc* at 10 feet or more; total phosphorus of less than 10 ug/l**)	■
SCORE	(No uses impaired)	■

RECREATIONAL USE	MODERATE	
	CRITERIA	SCORE
Swimming	Moderate bacteria levels (Fecal coliforms 50 to 200 per 100 ml)	2
Fishing	Slightly adverse conditions. Slight reduction in fish population.	2
Boating	10% to 30% affected	2
Aesthetics	Objects visible from 1.5 to 10 feet and moderate phosphorus level (Secchi Disc at 1.5 to 10 feet; total phosphorus 10 to 20 ug/l)	2
SCORE	(All uses moderately impaired)	5-8

RECREATIONAL USE	SIGNIFICANT	
	CRITERIA	SCORE
Swimming	Unhealthy bacteria levels (Fecal coliforms greater than 200 per 100 ml)	■
Fishing	Adverse conditons. Significant reduction in fish population.	■
Boating	More than 30% affected	■
Aesthetics	Objects not visible beyond 1.5 feet or high phosphorus level (Secchi Disc at less than 1.5 feet; total phosphorus greater than 20 ug/l)	■
SCORE	(All uses significantly impaired)	■

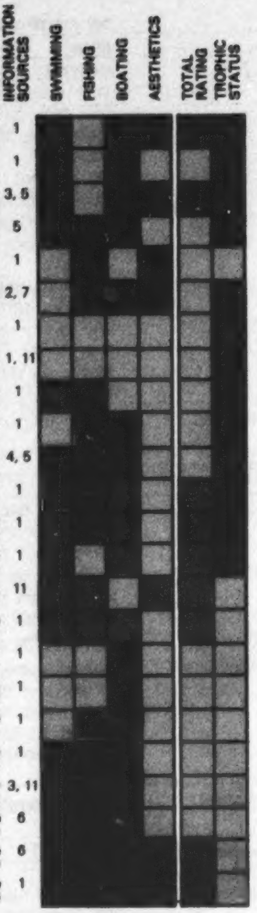
*A Secchi Disc is a round black and white plate suspended on a chain and used to determine water clarity.

**ug/l = micrograms per liter, a measurement used for low concentrations of dissolved substances.

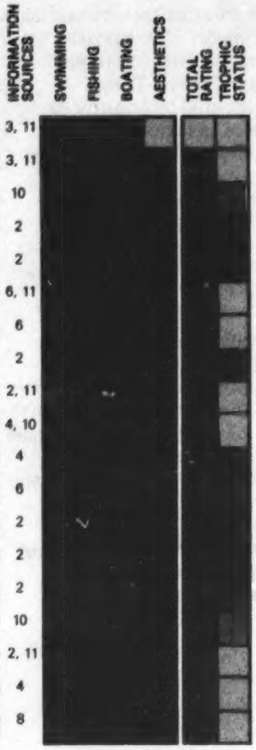
Lake Water Quality

Figure 33
The Recreational Impairment and Trophic Status of the Principal Recreational Lakes in Washington

NAME (County, Acres of Surface)	INFORMATION SOURCES	CAUSE OF PROBLEM
*Vancouver Lake (Clark Co., 2,600)	1	Stream-fed Nutrients
*Moses Lake (Grant Co., 7,000)	1	Agricultural Runoff/Erosion
Silver Lake (Cowlitz Co., 2,300)	3, 5	Forest Practices
*Hicks Lake (King Co., 5)	5	Stormwater
*Lake Sacajawea (Clark Co., 53)	1	Stormwater
Capitol Lake (Thurston Co., 270)	2, 7	Stormwater/ Streamfed Nutrients
*Long Lake (Thurston Co., 330)	1	Internal Nutrient Recycling
*Patterson Lake (Thurston Co., 270)	1, 11	Internal Nutrient Recycling
*Wapato Lake (Pierce Co., 28)	1	Stormwater
*Green Lake (King Co., 260)	1	Stormwater & Nearshore Runoff
Potholes Reservoir (Grant Co., 20,000)	4, 5	Agricultural Runoff
*Lake Stevens (Snohomish Co., 1,000)	1	
*Lake Campbell (Skagit Co., 370)	1	Internal Nutrient Recycling
*Lake Erie (Skagit Co., 100)	1	
*Kitsap Lake (Kitsap Co., 250)	11	
*Long Lake (Kitsap Co., 340)	1	Internal Nutrient Recycling
*Lake Ballinger (Snohomish Co., 100)	1	Stormwater
*Pine Lake (King Co., 85)	1	Internal Nutrient Recycling
*Fenwick Lake (King Co., 24)	1	Stormwater
*Liberty Lake (Spokane Co., 700)	1	
Park Lake (Grant Co., 350)	3, 11	
Lake Sammamish (King Co., 5,000)	6	
Banks Lake (Grant Co., 25,000)	6	
*Medical Lake (Spokane Co., 160)	1	



NAME (County, Acres of Surface)	INFORMATION SOURCES	CAUSE OF PROBLEM
Big Lake (Skagit Co., 520)	3, 11	
Deep Lake (Thurston Co., 65)	3, 11	
Lake Quinault (Grays Harbor Co., 3,700)	10	
Lake Cushman (Mason Co., 4,000)	2	
Crescent Lake (Clallam Co., 5,100)	2	
Lake Whatcom (Whatcom Co., 5,000)	6, 11	
Lake Ozette (Clallam Co., 7,800)	6	
Lake Merwin (Clark Co., 4,000)	2	
Lake Tapps (Pierce Co., 2,300)	2, 11	
Lake Washington (King Co., 22,000)	4, 10	
Rose Lake (Whatcom Co., 11,500)	4	
Lake Chelan (Chelan Co., 33,500)	6	
Lake Wenatchee (Chelan Co., 2,500)	2	
Kachess Lake (Kittitas Co., 4,500)	2	
Cle Elum Lake (Kittitas Co., 4,800)	2	
Baker Lake (Whatcom Co., 3,600)	10	
Osoyoos Lake (Okanogan, Ferry & Stevens Co., 2,000)	2, 11	
Lake Roosevelt (Lincoln Co., 79,000)	4	
Lake Wallula (Benton Co., 19,000)	8	



■ NON-EUTROPHIC
▨ MODERATELY EUTROPHIC
■ EUTROPHIC
■ LITTLE OR NO IMPAIRMENT
▨ MODERATE IMPAIRMENT
■ SIGNIFICANT IMPAIRMENT
■ STATUS UNKNOWN

*Clean Lakes Grant

INFORMATION SOURCES

1 Clean Lakes Project Reports
2 Washington State Department of Ecology (DOE), State/EPA Agreement, FY 1983
3 Washington State DOE, other than 2
4 University of Washington
5 Washington State University
6 EPA National Eutrophication Survey, 1975
7 CH_2M Hill, 1978
8 Corps of Engineers
9 Municipality of Metropolitan Seattle (METRO)
10 EPA Region 10
11 U.S. Geological Survey/DOE: "Trophic Classification of Washington Lakes," 1982.

Washington Lake Water Quality

Figure 33 shows the extent and major causes of use impairment for the principal recreational lakes in Washington. Vancouver Lake and Silver Lake are considered significantly impaired in two or more respects. Approximately half of the lakes shown are moderately impaired, generally due to aesthetic conditions. The majority of these have received Clean Lakes Grants. Most of the lakes with water quality problems receive stormwater runoff and septic tank seepage from lakeside residential areas. The large lakes and reservoirs of Eastern Washington also receive irrigation return flows and runoff from agricultural lands that contain fertilizers and animal wastes which accelerates the eutrophication processes.

The quality of some of these lakes have been significantly improved through local, state and Federal programs to restore recreational amenities. Medical lake was treated with alum to precipitate excess phosphorous to the lake bottom, to form a layer over the sediments. This treatment resulted in a 90 percent reduction in phosphorous and substantially reduced the algal growths. Liberty Lake was similarly treated, and the nutrient-rich upper layers of bottom sediment and aquatic weeds were dredged. Also a sewage collection system was built to eliminate septic pollution. Wapato Lake, in Tacoma, is successfully responding to dilution by low-nutrient city water. Plans to improve water quality in Vancouver Lake and Lake Sacajawea include dredging, dilution, and control of polluting urban and agricultural runoff. The dredging in Vancouver Lake is 75 percent complete.

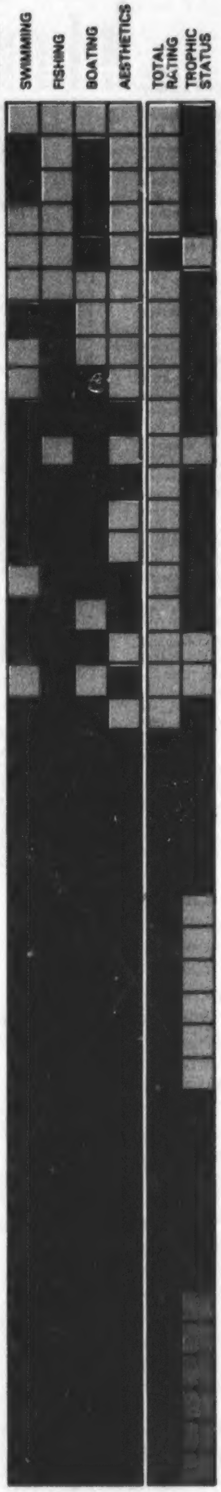
Lake Water Quality

Figure 34
The Recreational Impairment and Trophic Status of the Principal Recreational Lakes In Oregon[1]

regon Lake Water Quality
igure 34 shows the extent and major auses of use impairment for the principal ecreational lakes and other lakes of concern Oregon. Eighteen of these lakes are oderately impaired, mostly due to aesthetic onditions (algae blooms) and aquatic weed rowths. Nutrients that support the weed nd algal growths are, in some cases, upplied by bottom muds accumulated from oil erosion, and in others are due to septic rainage from recreational and residential evelopment.

he quality of a few of these lakes has been t least partially restored. In Diamond Lake, ouglas County, nutrients from sewage had ccelerated eutrophication. Sewage was iverted from the lake drainage, and fish-leaning and trailer-dumping stations were stalled to further limit nutrients reaching e lake. Other lakes still have problems. lue Lake near Portland, for example, has igh recreational potential, but it is highly utrophic with summer blooms of algae. This due in part to a nutrient-rich water supply. n the coast, Devil's Lake experiences rapid ltation due to stormwater runoff. iagnostic/feasibility studies funded by the lean Lakes Program have been completed r the restoration of Devil's Lake, Fern idge Reservior, Sturgeon Lake, Mirror ond. Similar studies for Klamath and Blue akes and a state-wide classification study e scheduled for completion by June 1983.

rospects for Mirror Pond and Devil's Lake storation look very good, due to local mmunities' funding support.



NAME (County, Acres of Surface)	INFORMATION SOURCES	CAUSE OF PROBLEM
Willow Creek Reservoir (Malheur Co., 1,000)		Irrigation Withdrawals Nutrients in Sediments
North Tenmile Lake (Coos Co., 1,000)		Introduced Nuisance Weeds
South Tenmile Lake (Coos Co., 1,400)		Introduced Nuisance Weeds
***Klamath Lake** (Klamath Co., 59,000)		Nutrients in Sediments
***Devil's Lake** (Lincoln Co., 680)	2	Nutrients in Influent Streams and Sediments
***Blue Lake** (Multnomah Co., 65)	2	Nutrients in Sediments, Weeds
***Mirror Pond** (Deschutes Co., 30)	2	Stream-fed Nutrients, Siltation, Weeds
***Sturgeon Lake** (Multnomah, Columbia Co., 1,900-4,800)	2	Siltation
Emigrant Reservoir (Jackson Co., 800)		Nutrients in Sediments, Irrigation Withdrawals
Siltcoos Lake (Lane, Douglas Co., 3,000)		Introduced Nuisance Weeds
McKay Creek Reservoir (Umatilla Co., 1,200)		Introduced Nuisance Weeds Irrigation Withdrawals
Ochoco Reservoir (Crook Co., 1,100)		Nutrients in Sediments
Owyhee Reservoir (Malheur Co., 14,000)	3	Nutrients in Sediments
Suttle Lake (Jefferson Co., 270)	1, 3	Stream-fed Nutrients
Cleawox Lake (Lane Co., 1,400)		Septic Tanks
Tahkenitch Lake (Douglas Co., 1,500)		Introduced Nuisance Weeds
Hills Creek Reservoir (Lane Co., 2,700)	1, 3	Erosion
***Fern Ridge Reservoir** (Lane Co., 9,400)	2	Turbidity, Shallow Depth
Diamond Lake (Douglas Co., 2,000)		
Chinook Lake (Jefferson Co., 3,600)		
Prineville Reservoir (Crook Co., 3,000)		
Crane Prairie Reservoir (Deschutes Co., 4,900)		
Davis Lake (Deschutes, Klamath Co., 3,700)		
Wickiup Reservoir (Deschutes Co., 11,000)		
Lake of the Woods (Klamath Co., 1,200)		
Henry Hagg Lake (Washington Co., 1,100)		
Green Peter Reservoir (Linn Co., 3,700)		
Timothy Lake (Clackamas Co., 1,300)		
Lake Paulina (Deschutes Co., 1,400)		
Odell Lake (Klamath Co., 3,300)		
Waldo Lake (Lane Co., 6,700)	1, 3	
Crater Lake (Klamath Co., 13,000)		
Crescent Lake (Klamath Co., 3,500)		
Lake Wallowa (Wallowa Co., 1,800)		
Cultus Reservoir (Deschutes Co., 1,300)		
Olallie Lake (Jefferson Co., 180)		
Detroit Reservoir (Linn, Marion Co., 3,000)		
Blue River Reservoir (Lane Co., 1,000)		
Cottage Grove Reservoir (Lane Co., 1,000)		
Dorena Reservoir (Lane Co., 1,800)		
Foster Reservoir (Linn Co., 1,200)		
Cougar Reservoir (Lane Co., 1,200)		

■ NON-EUTROPHIC
▨ MODERATELY EUTROPHIC
■ EUTROPHIC
■ LITTLE OR NO IMPAIRMENT
▨ MODERATE IMPAIRMENT
■ SIGNIFICANT IMPAIRMENT
■ STATUS UNKNOWN

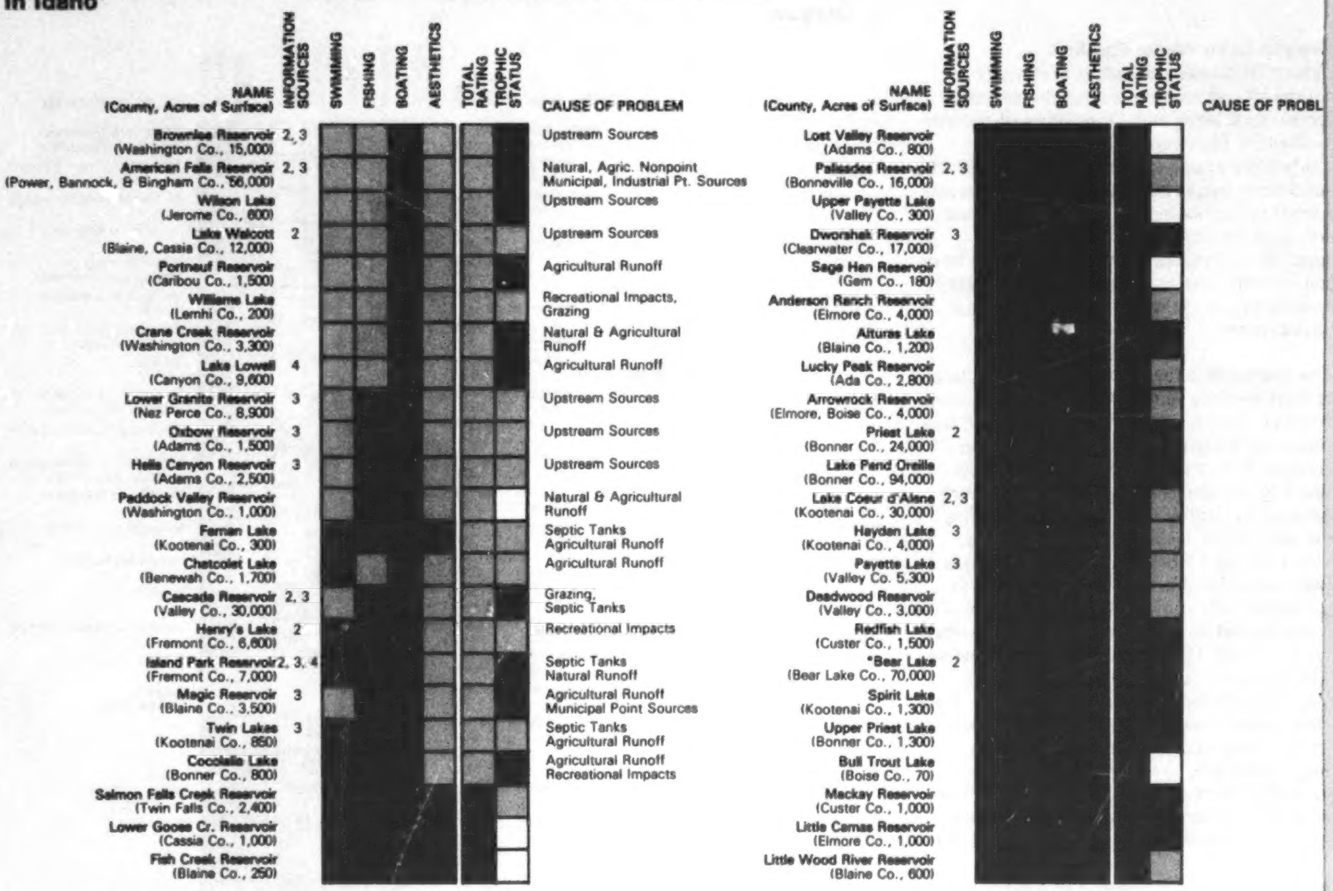
*Clean Lakes Grant

INFORMATION SOURCES

1 Except as otherwise noted, impairment and trophic status ratings based upon information supplied by Oregon Department of Environmental Quality (DEQ)
2 Clean Lakes Project Reports
3 EPA National Eutrophication Survey, 1975

Lake Water Quality

Figure 35
The Recreational Impairment and Trophic Status of the Principal Recreational Lakes In Idaho[1]



NAME (County, Acres of Surface)	INFORMATION SOURCES	SWIMMING	FISHING	BOATING	AESTHETICS	TOTAL RATING	TROPHIC STATUS	CAUSE OF PROBLEM
Brownlee Reservoir (Washington Co., 15,000)	2, 3	▨	▨	■	▨	▨	■	Upstream Sources
American Falls Reservoir (Power, Bannock, & Bingham Co., 56,000)	2, 3	▨	▨	■	▨	▨	■	Natural, Agric. Nonpoint Municipal, Industrial Pt. Sources
Wilson Lake (Jerome Co., 600)		▨	▨	■	▨	▨	■	Upstream Sources
Lake Walcott (Blaine, Cassia Co., 12,000)	2	▨	▨	■	▨	▨	▨	Upstream Sources
Portneuf Reservoir (Caribou Co., 1,500)		▨	▨	■	▨	▨	■	Agricultural Runoff
Williams Lake (Lemhi Co., 200)		▨	▨	■	▨	▨	▨	Recreational Impacts, Grazing
Crane Creek Reservoir (Washington Co., 3,300)		▨	▨	■	▨	▨	■	Natural & Agricultural Runoff
Lake Lowell (Canyon Co., 9,600)	4	▨	▨	■	▨	▨	■	Agricultural Runoff
Lower Granite Reservoir (Nez Perce Co., 8,900)	3	▨	■	■	▨	▨	▨	Upstream Sources
Oxbow Reservoir (Adams Co., 1,500)	3	▨	■	■	▨	▨	▨	Upstream Sources
Hells Canyon Reservoir (Adams Co., 2,500)	3	▨	■	■	▨	▨	▨	Upstream Sources
Paddock Valley Reservoir (Washington Co., 1,000)		▨	■	■	▨	▨	□	Natural & Agricultural Runoff
Fernan Lake (Kootenai Co., 300)		■	■	■	■	▨	▨	Septic Tanks Agricultural Runoff
Chatcolet Lake (Benewah Co., 1,700)		■	▨	■	▨	▨	▨	Agricultural Runoff
Cascade Reservoir (Valley Co., 30,000)	2, 3	▨	■	■	▨	▨	■	Grazing, Septic Tanks
Henry's Lake (Fremont Co., 6,600)	2	■	■	■	▨	▨	▨	Recreational Impacts
Island Park Reservoir (Fremont Co., 7,000)	2, 3, 4	■	■	■	▨	▨	■	Septic Tanks Natural Runoff
Magic Reservoir (Blaine Co., 3,500)	3	▨	■	■	▨	▨	■	Agricultural Runoff Municipal Point Sources
Twin Lakes (Kootenai Co., 850)	3	■	■	■	▨	▨	▨	Septic Tanks Agricultural Runoff
Cocolalla Lake (Bonner Co., 800)		■	■	■	▨	▨	■	Agricultural Runoff Recreational Impacts
Salmon Falls Creek Reservoir (Twin Falls Co., 2,400)		■	■	■	■	■	▨	
Lower Goose Cr. Reservoir (Cassia Co., 1,000)		■	■	■	■	■	□	
Fish Creek Reservoir (Blaine Co., 250)		■	■	■	■	■	□	

NAME (County, Acres of Surface)	INFORMATION SOURCES	SWIMMING	FISHING	BOATING	AESTHETICS	TOTAL RATING	TROPHIC STATUS	CAUSE OF PROBL
Lost Valley Reservoir (Adams Co., 800)		■	■	■	■	■	□	
Palisades Reservoir (Bonneville Co., 16,000)	2, 3	■	■	■	■	■	▨	
Upper Payette Lake (Valley Co., 300)		■	■	■	■	■	□	
Dworshak Reservoir (Clearwater Co., 17,000)	3	■	■	■	■	■	■	
Sage Hen Reservoir (Gem Co., 180)		■	■	■	■	■	□	
Anderson Ranch Reservoir (Elmore Co., 4,000)		■	■	■	■	■	▨	
Alturas Lake (Blaine Co., 1,200)		■	■	■	■	■	■	
Lucky Peak Reservoir (Ada Co., 2,800)		■	■	■	■	■	▨	
Arrowrock Reservoir (Elmore, Boise Co., 4,000)		■	■	■	■	■	▨	
Priest Lake (Bonner Co., 24,000)	2	■	■	■	■	■	■	
Lake Pend Oreille (Bonner Co., 94,000)		■	■	■	■	■	■	
Lake Coeur d'Alene (Kootenai Co., 30,000)	2, 3	■	■	■	■	■	▨	
Hayden Lake (Kootenai Co., 4,000)	3	■	■	■	■	■	▨	
Payette Lake (Valley Co. 5,300)	3	■	■	■	■	■	▨	
Deadwood Reservoir (Valley Co., 3,000)		■	■	■	■	■	▨	
Redfish Lake (Custer Co., 1,500)		■	■	■	■	■	■	
***Bear Lake** (Bear Lake Co., 70,000)	2	■	■	■	■	■	■	
Spirit Lake (Kootenai Co., 1,300)		■	■	■	■	■	■	
Upper Priest Lake (Bonner Co., 1,300)		■	■	■	■	■	■	
Bull Trout Lake (Boise Co., 70)		■	■	■	■	■	□	
Mackay Reservoir (Custer Co., 1,000)		■	■	■	■	■	■	
Little Camas Reservoir (Elmore Co., 1,000)		■	■	■	■	■	■	
Little Wood River Reservoir (Blaine Co., 600)		■	■	■	■	■	▨	

■ NON-EUTROPHIC
▨ MODERATELY EUTROPHIC
■ EUTROPHIC
■ LITTLE OR NO IMPAIRMENT
▨ MODERATE IMPAIRMENT
■ SIGNIFICANT IMPAIRMENT
□ STATUS UNKNOWN

*Clean Lakes Grant

INFORMATION SOURCES

1 Evaluations derived from the Idaho Lakes Classification Proj and miscellaneous Idaho Department of Health and Welfare information.
Additional Sources:
2 Falter, University of Idaho
3 EPA National Eutrophication Survey, 1975
4 U.S. Bureau of Reclamation

Idaho Lake Water Quality

Figure 35 shows the extent and major causes of use impairment for the principal recreational lakes in Idaho. Most major impairments of the principal lakes in Idaho appear to be due to algal blooms stimulated by nutrients from agricultural runoff and septic tanks. Runoff from agricultural non-point sources entering the Snake River upstream of Oxbow and Brownlee Reservoirs has degraded those two water bodies. Lake Lowell, an off-stream reservoir near Boise, receives heavy recreational use by residents of the Boise Valley. Excessive algal growth in the summer impairs such use. The conditions are primarily due to nutrients from summer inflows from agricultural non-point sources and the large waterfowl population which utilizes the lake. Because of the significant impact due to waterfowl, control of the agricultural sources of nutrients may not achieve a solution to this problem.

The water quality of American Falls Reservoir is affected by nutrients from dryland and irrigated agriculture, winter discharges of treated sewage effluent from Pocatello, phosphate deposits in the soils and from many springs in the area.

Many of the lakes in the Panhandle area of Northern Idaho are presently of high quality. However, development around the lakes is increasing and the lakes are extensively used for recreation. Some of the lakes are showing signs of degradation. In order to protect these valuable resources, lake shore management plans are being developed to insure that development occurs with minimal impacts on lake water quality.

Federal funding to deal with lake water quality problems has been through the 208 and Clean Lakes programs. Idaho presently has two Clean Lakes grants; one to do a lake classification analysis (recently completed) to determine the trophic status of Idaho's lakes and the other to study pollution sources in Bear Lake and to develop a restoration plan. The 208 and Clean Lakes programs, however, are being phased out because of cuts in Federal funding.

Lake Water Quality

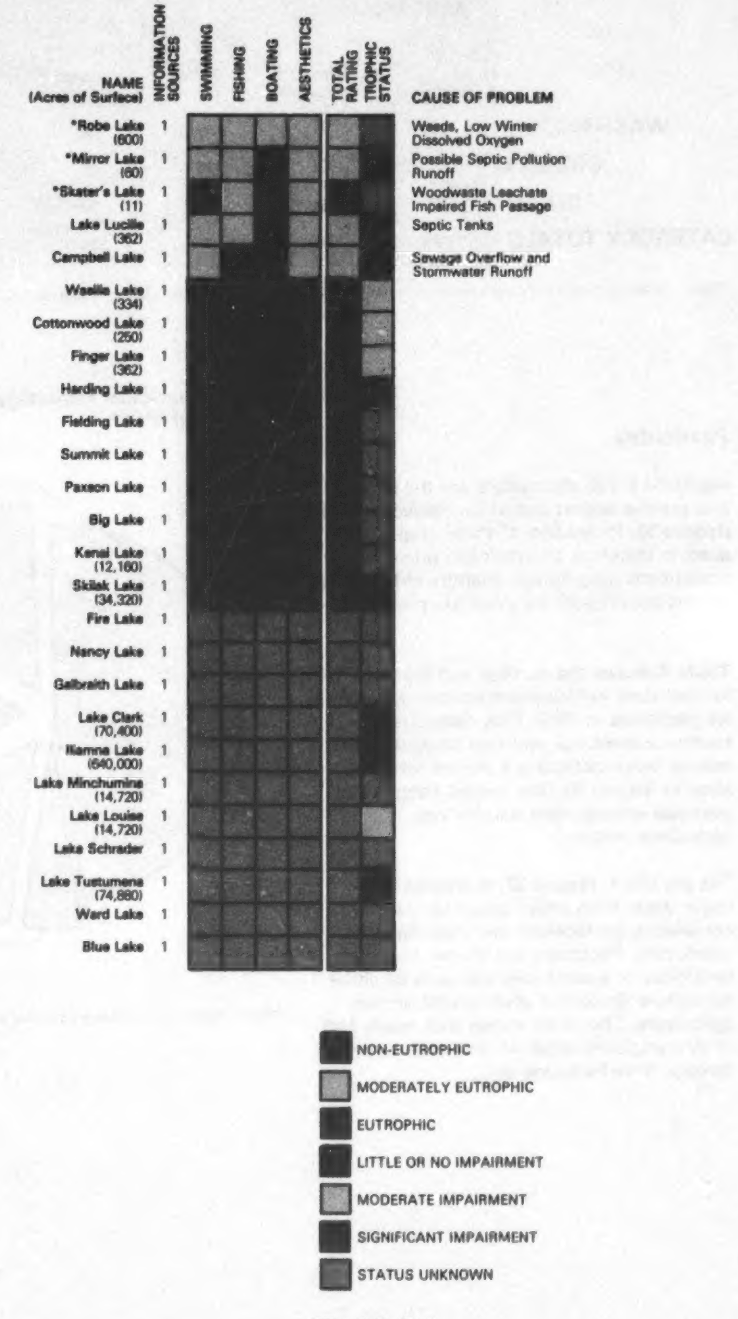
laska Lake Water Quality

ittle is known about most Alaska lakes. everal of the more readily accessible lakes ear population centers are exhibiting signs f advancing eutrophication and recreational se impairment as shown in **Figure 36**. hree of these have received Clean Lakes rants for diagnostic/feasibility studies kater's, Robe and Mirror Lakes) scheduled r completion by July 1983.

ecently the state studied certain lakes in the almer-Wasilla area, a fertile farming region ear Anchorage which is experiencing rapid sidential development. The Alaska epartment of Fish and Game has found 36 over 100 lakes with low dissolved oxygen the winter, although the cause is nknown. For many lakes, it may be a tural condition; however, human activities ay be a contributing factor.

e trophic conditions of four lakes near asilla (Lucille, Wasilla, Cottonwood and nger) were studied more intensely. All are avily used for recreation, and the public s expressed some concern about water ality. Of the four, Lucille is the most allow, with a mean depth of 1.7 meters, d also the most eutrophic. In winter ssolved oxygen levels drop to almost zero, d the lake has a history of fish kills. There considerable algae growth in the summer, ough not yet to the extent that it interferes ith boating. The lake is not used much for imming since it is so shallow. The other ree lakes are deeper and are only oderately eutrophic, with some algae owth in isolated portions of the lakes.

Figure 36
The Recreational Impairment and Trophic Status of the Principal Recreational Lakes In Alaska



*Clean Lakes Grant

INFORMATION SOURCES

1 Evaluations based upon information supplied by miscellaneous Alaska Department of Environmental Conservation Publications and Clean Lakes Project Reports.

Pesticides

Table 4
EPA Funded 1982 State* Pesticide Enforcement Inspections

	MISUSE INVESTIGATIONS		ROUTINE SURVEILLANCE						
	Agriculture	Non Agricultural	Market Place	Producer Establishment	Restricted Use Pesticide Dealers	Certified Application Records	Experimental Use Permits	Imports	State Totals
WASHINGTON	[illegible]	31	23	30	35	18	5	0	258
OREGON	[illegible]	19	38	23	24	20	3	4	200
IDAHO	67	33	15	10	13	10	5	0	163
CATEGORY TOTALS	[illegible]	[illegible]	77	63	[illegible]	48	13	4	651

*Note: Alaska's enforcement program has been too recently initiated for its efforts to be reflected in these figures.

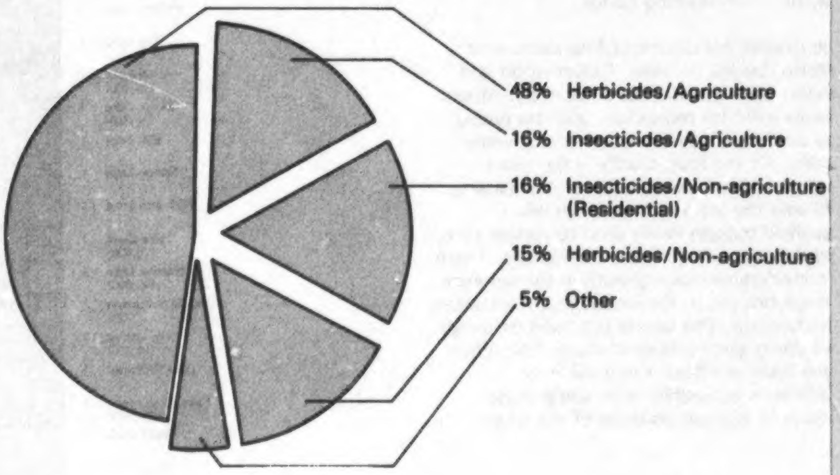
Pesticides

Agriculture and silvaculture are the largest and second largest industries respectively in Region 10. Protection of these crops from pests is therefore an economic priority. The accompanying graphics quantify enforcement related activities in the pesticide program area.

Table 4 shows the number and type of EPA funded state enforcement actions conducted for pesticides in 1982. Five categories of routine surveillance and two categories of misuse investigations are shown for each state in Region 10. The largest category of pesticide enforcement activity was agriculture misuse.

The pie chart, **Figure 37**, illustrates the major areas from which pesticide use complaints are received and investigations conducted. Pesticides are shown as either herbicides or insecticides and uses as either agriculture (including silvaculture) or non-agriculture. The chart shows that nearly half of all complaints received deal with crop damage from herbicide drift.

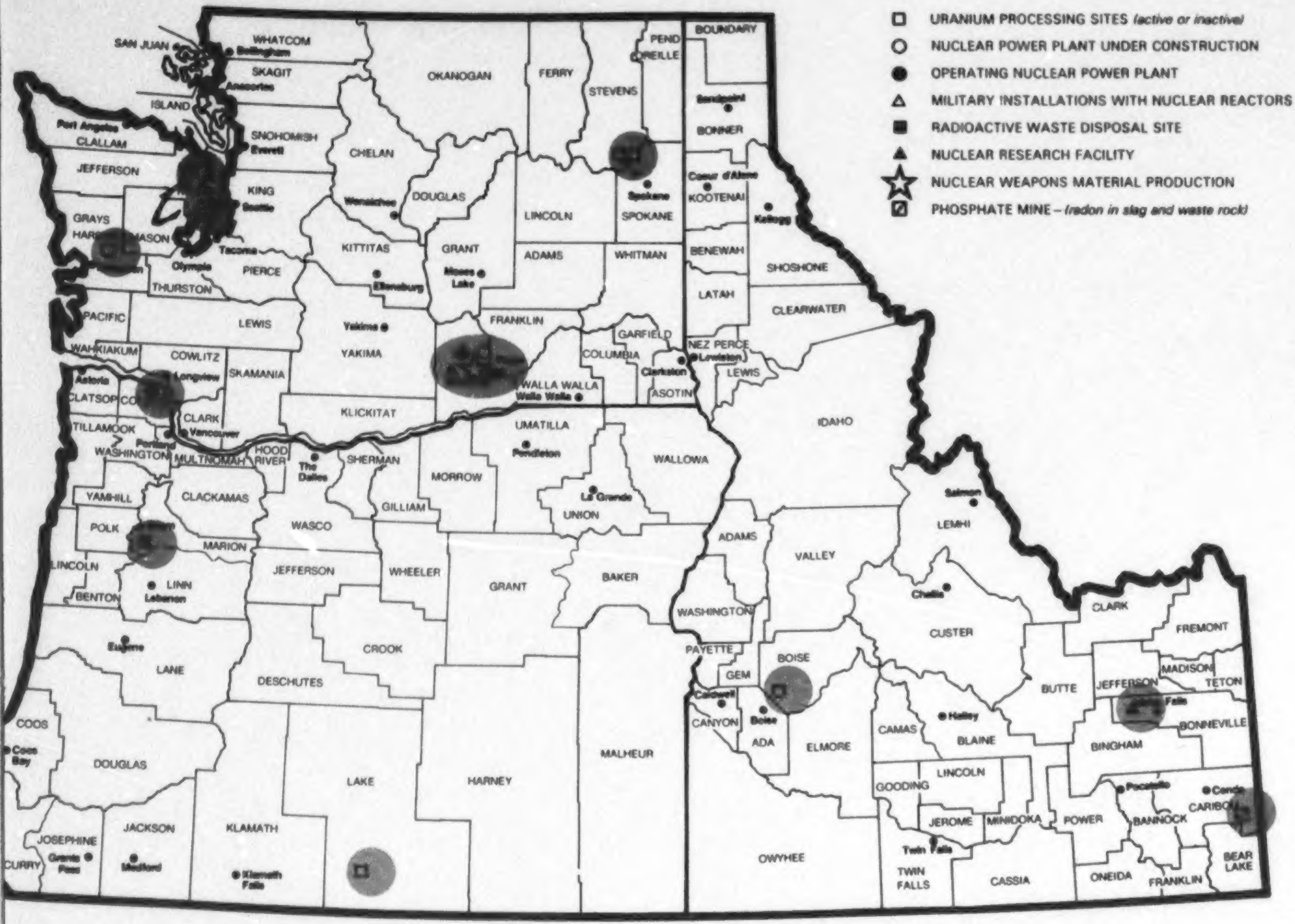
Figure 37
State Pesticide Investigations by Type and Use*



*Note: Alaska's enforcement program has been too recently initiated for its efforts to be reflected in these figures.

Radiation

igure 38
ites of Significant Nuclear Activity in Region 10



☐ URANIUM PROCESSING SITES *(active or inactive)*
○ NUCLEAR POWER PLANT UNDER CONSTRUCTION
● OPERATING NUCLEAR POWER PLANT
△ MILITARY INSTALLATIONS WITH NUCLEAR REACTORS
■ RADIOACTIVE WASTE DISPOSAL SITE
▲ NUCLEAR RESEARCH FACILITY
☆ NUCLEAR WEAPONS MATERIAL PRODUCTION
▨ PHOSPHATE MINE – *(radon in slag and waste rock)*
IDAHO

adiation

igure 38 shows the location of major uclear facilities and other sites where ignificant quantities of radioactive materials re either processed, disposed or stored in egion 10. Commercial, military and overnmental sites are included. Every major ype of nuclear facility and major operation in the nuclear fuel cycle are present in Region 10, including operating nuclear power plants, nuclear plants under construction, fuel fabrication and reprocessing plants, high-level, low-level and transuranic radioactive disposal sites, active and inactive uranium processing mills, nuclear submarine support facilities and phosphate processing plants.

The two largest and most significant nuclear facilities are the Hanford facility in Southeastern Washington and the Idaho National Engineering Laboratory in Southeastern Idaho.

There are no significant nuclear facilities in Alaska.